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BEGINNING May 19, the *Railway Age Gazette* will publish in its third weekly issue of each month a section devoted to engineering and maintenance of way matters, similar to the shop section now published in its first weekly issue of each month. It should be understood that engineering matter will not be confined to this section; in fact, more space than ever will be given to engineering articles in all the other weekly issues. The section in question will be chiefly given over to the consideration of means for increasing the efficiency and economy of maintenance work. For the purpose of getting material about methods and devices not now in general use, but which have been effectively employed by individual railway men or individual lines to increase the economy and efficiency of maintenance work, we shall award a first prize of $25 and a second prize of $15 for the best contributions that may be sent to us describing such methods or devices. All contributions submitted in this competition which do not win prizes, but which are published, will be paid for at a flat rate of $3 each. The various articles will be printed in the engineering and maintenance section from time to time. Descriptions should be brief, but clear; and drawings, photographs, or sketches should accompany the matter unless entirely clear without them. Questions of correct English, the finish of sketches, etc., will not enter into the making of the awards. All contributions entered in this contest should be sent to the civil engineering editor of the *Railway Age Gazette,* Plymouth building, Chicago, and should be received by us not later than June 1.

A SOMEWHAT interesting venture is to be tried on the New York, New Haven & Hartford. The city of Waterbury, on the Naugatuck branch, is an isolated but progressive city of about 75,000 inhabitants, allowing for increase during the year since the last census was taken. It had 73,141 inhabitants when the census was taken, 51,139 in 1900 and 33,202 in 1890, its population having thus increased more than 121 per cent. in two decades. Its only railway outlets are on the New Haven system and, barring distant trolley connections, passengers must travel by steam lines to and from the city. Moreover, just now it is a period of pretty acute economies on the New Haven system, with general reductions of working force, of freight service and, in less degree, of passenger train service. Yet Waterbury is now to be the objective of a new route between Boston and New York via Hartford, with two express trains daily—one each way—making the running time between the two terminals in a little more than six hours. It is an application of the theory that new train facilities make new business—that more passengers will travel accordingly, as they are given greater opportunity. That is a law which sooner or later enforces itself, only in this case it has a radical application, the outworking of which will be instructive in the case of a community comparatively remote from a railway's main stem. The plan recalls, by contrast, an incident of the New Haven road's history. It was at a meeting of the old moss-back directorate some 35 years ago that the president proposed a new express train between New York and New Haven. A white-haired director strenuously objected to it. "Why, gentlemen," said he, in high wrath, "it won't be a week before passengers will be crowding it!"

UNTIL last Tuesday it was hoped that the Missouri Pacific was to be put in proper physical shape and made to take the position it ought to among western roads. The prospects now are bad. The Gould interests are still in control and the company has lost its promised powerful financial support. The latter is not, however, any irretrievable loss. The Missouri Pacific credit is fundamentally good and it could get money at reasonable rates in the open market. It is not highly capitalized. Its underlying issues are all closed and what it has to sell now are the 5 per cent. convertibles; it could sell a good many of them without having to take a heavy discount. But Gould control does not mean operating efficiency. While competing railways have been improving physically, the Missouri Pacific has been deteriorating; while others have increased their earnings, the Missouri Pacific's have decreased; service on other roads has been improving and on the Missouri Pacific it has been getting worse. Out of its 6,775 miles of track, 2,200 miles are laid with 56-lb. rail and 414 miles are laid with 52-lb. rail. It is not that the road has not had competent men in the operating, traffic and other departments, but that it has not had home rule. The men having real

power in the Gould organizations have often not been actively engaged in work on the properties, while the men on the ground have not had enough authority or money to do their work. If President Bush is given a free hand and allowed to manage the road from its headquarters at St. Louis, or, better still, from his car out on the line, he will have the greatest opportunity of any railway man in the country. If he is not given this chance, he has before him the hardest and most thankless task of any railway man in America. His work is to build up a physically run-down property and at the same time get the public behind him. To do this he has got to show the public that he is working in their interests, and he has got to do this in the face of the well founded prejudice of people toward a road which certainly has *not* been run in their interests. The Missouri Pacific could be developed into one of the greatest railway properties in the West, but this cannot be done if details of its management are dictated 1,500 miles away from the nearest end of its rails. The shortcomings of the Gould lines have been primarily due to absentee landlordism, which has been the curse of many other American railways. Our railways must give good service at reasonable rates, and the absentee landlord form of management is not the kind that gives either.

THE Nebraska State Railway Commission finds that "generally speaking, there is no imperative demand for new railway legislation at the present time." Still, the commission does not fail to recommend some changes in the present railway laws of Nebraska and some additions thereto. The commission in its third annual report, says in good grammatical English, that it wishes to be entirely fair to the railways. One of the laws that the commission recommends is, that severe penalties be provided for shippers found guilty of false billing, since severe penalties are prescribed for railway companies that are guilty of false billing. More light, however, was thrown on the commission's conception of what it was paid for by its manner of discussing present litigation now pending between the railways and the commission than is given by any number of general assurances that the commission intends to be perfectly impartial. In referring to the railways' suit attacking the validity of the commodities freight rate law and the maximum passenger rate law enacted by the legislature of 1907, the commission points out that it is usual in cases of this kind for the railways to enjoin state and railway commissions from enforcing laws reducing rates and fares, thus continuing the higher rates until the reasonableness of the lower rates has been determined. The commission points out that if the supreme court should reverse the lower courts in the Missouri rate case the railways will have been able to charge the higher rates in the five and a half years during which litigation has been carried on. The commission points out with a pride than amounts almost to a boast that such a situation does not obtain in Nebraska because of the prompt action of the attorney general's office in connection with the commission. Anticipating that the railways would refuse to put the reduced rates of the Nebraska 1907 law into effect, action was brought to enjoin them from disobedience of the laws, and both the maximum passenger rate and commodity freight rate acts were made effective. The commission estimates that the total actual saving to the people of Nebraska, by reason of the enforcement of these two bills, is considerably in excess of $10,000,000 to date. The commission does not point out that, if the supreme court should decide that the Nebraska laws were confiscatory, the commission, through its promptness in connection with the attorney general's office, will have succeeded in getting out of the railway companies $10,000,000 for the people of Nebraska, which belonged to the railway companies. The total expenses of the commission for the year 1910, exclusive of the physical valuation department, were $14,375. Surely the commission does not *need* to point out that if it can get for the people of Nebraska $10,000,000 of the railways' money, they are making a wise investment to spend $14,000 for a commission.

THE PSYCHOLOGY OF ANTI-RAILWAY LEGISLATION.

RETURNS from 37 state legislatures in session this year—not including that of Maine and probably some other of the 46 states—show no less than 484 new bills relating to railway operation alone. The number would, no doubt, be increased much did it include such matter as capitalization, power of railway commissions, accounting, relations of railways to one another, and broad matters of a similar character. The great majority of the new measures, as was to be expected, look to railway restriction and often to new expenditure. The record also shows some striking variations. A slow and small commonwealth like Vermont, but an old state where one would infer that railway legislation had long ago passed its formative and plastic stage, has as many new measures as the new state of Washington, where population and development are going on by leaps and bounds; and by farther contrast the great state of Pennsylvania has only 3 and New York but 13. There are local lifts and depressions. But, as a general conclusion from the returns as a whole, the hoped for general reduction of railway baiting has not been realized, especially if the measures bearing on branches outside of operation are taken into account. Some of them are of exceptional import as, for example, the long and bitter fight over a public utilities commission in Connecticut now coming to a new climax after four years of controversy.

So protracted and persistent a period of anti-railway legislation, itself to a great extent an expression of a state of public feeling, can be viewed from many corners. One is its psychology, using the term to denote sentimental elements, as contrasted with material interests—the influences which affect popular and legislative feeling as contrasted with the more vulgar irritants and the pocket nerve.

Far back and in the beginning it probably dates for its original impulse to the mental attitude of the railway corporation itself. There can be no denying that for many years that attitude was as offensive as it was misguided. It was the bearing toward the public and, more particularly toward the passenger, of a superior being exalted by circumstance over the average man. Corporation hauteur reached from the president down to the conductor and brakeman; and even the stockholder—unless owner of a big block of shares—was viewed not as master, but minion. The passenger, after a fashion, took the status of a bale of goods; and, in large scope, the profane phrase of the second Vanderbilt expressed a railway mental condition. Something was needed to incarnate and focus popular resentment on that condition. It came when our spectacular and decidedly psychological ex-president struck his counter pose. It was material in form, in its aims against concrete abuses, actual or alleged. But it was emotional in its effects on the popular imagination and in arousing an anti-railway sentimentality. That it went too far does not abate the fact.

It had also secondary derivative influences of an emotional character. The head of the nation is *per se* a psychological force, especially when in picturesque and spectacular action. His temperament, as well as policy, reaches through the whole federal organism with its host of attorneys and passes by easy transition into state policy also. It will not escape the eye of the historical student that the wave of anti-railway legislation in the states has owed its antecedent impulse to Washington. The movement was logically enough, from the executive head downwards, and, later, from the federal legislature down to the state legislature. Under our political system all such movements are contagious; and, once they get fairly started, and the vaulting ambition of the politician sees the opportunity to ride them, his oratory foams on the crests of the wave, as a fresh irritant. Running through all these popular impulses has undoubtedly been a motive of public interest here and there reaching down into socialism. But the latter, at least, has been a minor force and effecting the individual rather than the mass.

The psychology of labor in the situation is not to be overlooked. Synchronous with the four years or more of anti-railway

statute making has been not merely a rapid development of labor organization, but of change in labor's mental attitude. It has had two phases. First, the transfer of loyalty from the corporation to the union, and, secondly, the legislative campaign on the part of labor for milder working conditions on the railway. The men have secured higher wages with comparative ease and with general success. The result is a state of mind that has prompted them to appeal to the legislatures for what may be called higher wage in another shape—the wages for either a larger force of workers or, what is often tantamount, an easier individual job. It would be interesting to know how many of the 484 measures relating to railway operation before 37 state legislatures have been due to this emotional momentum started by the easy success of the unions in securing a higher wage. It would be even more interesting if we could foresee when the movement will recede.

Finally there can hardly be a doubt that the tendency of great cases in the higher tribunals bearing on railway questions has kept up the emotional tension and had a direct effect on anti-railway legislation. The magnitude of the cases and of the interests at stake in the final interpretation of such a federal statute as the Anti-Trust act have been constant and exciting causes of popular feeling. Nor can one now see where that judicial excitation is to end.

INCREASING TARIFF EXPENSES.

AT a time when the Interstate Commerce Commission has just said that the railways cannot be permitted to raise their rates unless they show that they are operating with reasonable economy, all of the causes which tend to increase expenses, or to prevent their reduction, become of interest and importance. Perhaps no class of railway expenses has increased so fast in proportion in recent years as those incurred in the preparation and publication of railway tariffs. The *Railway Age Gazette,* in its issue of July 15, 1910, page 111, published an editorial discussing this subject, in which it gave some figures regarding the increases in these expenses on the Wabash, the New York Central Lines and the Burlington. We have since secured more detailed information from a number of roads, which is even more striking than that given in the editorial referred to.

The expenditures of the Chicago, Milwaukee & St. Paul during the years from January 1, 1900, to December 31, 1909, have been as follows:

1900	$22,392.83	1905	$24,807.40
1901	20,935.59	1906	27,930.69
1902	19,440.92	1907	38,508.19
1903	29,448.95	1908	67,929.06
1904	33,049.29	1909	92,199.05

The following comparison of the year 1906—the one in which the Hepburn act went into effect—with the year 1909 is of interest:

1906.	1909.	Increase.	Per cent.
$27,930.69	$92,199.05	$64,268.36	231

Of the sum expended since January 1, 1907, $15,000 represented the cost of compiling and printing the index to tariffs, which is published under a rule of the Interstate Commerce Commission, and which a traffic officer of the St. Paul pronounces "totally valueless."

The following figures show the increases in the similar expenses of the Rock Island Lines:

	Printing.			Clerical Help.	
	Annual expense.	Expense per mile of road.	Expense per $100,000 frt. earnings.	Annual expense.	Expense per mile of road.
1905-6...	$44,535.06	$6.17	$128	$25,992.96	$3.60
1906-7...	71,145.40	10.43	202	27,515.84	3.53
1908-9...	119,828.18	14.93	306	31,727.18	3.95

The increase in the printing expense per mile of road between 1906 and 1909 was almost 142 per cent., and the increase per $100,000 of freight earnings was almost 155 per cent.

In the St. Louis & San Francisco's figures are included those for 1887, the year in which the original Interstate Commerce act was passed, as well as those for later years. Its figures are as follows:

	Printing.			Clerical Help.		
Year.	Annual expense.	Expense per mile of road.	Expense per $100,000 frt. earnings.	Year.	Annual expense.	Expense per mile of road.
1887,....	$7,665	$7.00	$180.00	1887...	$8,280.00	$7.56
1905-6...	80,976	16.00	390.00	1906...	22,644.00	4.47
1906-7...	106,512	21.00	400.00	1907...	36,600.00	7.21
1909-10..	.....	25.00	470.00			

The increase in the printing cost per mile of road since the Hepburn act went into effect has been 56 per cent.; in the printing cost per $100,000 of freight earnings, 21 per cent.; and in the total clerical help, 62 per cent.

The following figures are for the Chicago, Burlington & Quincy:

	Clerical Help.	Printing.	Total.
1903.....	$29,883	$28,526	$58,409
1904.....	31,732	39,540	71,272
1905.....	31,308	37,316	68,624
1906.....	37,462	35,011	72,473
1907.....	53,394	88,925	142,319
1908.....	54,045	134,358	188,403
1909.....	53,030	179,279	232,309
1910.....	56,353	158,046	214,399

It will be noted that the increase in the cost of clerical help in 1910 over 1906 was more than 50 per cent., the increase in the cost of printing tariffs over 351 per cent., and the increase in the total cost of preparing and printing them almost 196 per cent.

On the Illinois Central the cost of clerical help in the tariff department was $74,829.94 in 1905, and this increased to $124,788.71 in 1909, or 66.7 per cent. The cost of tariff publication increased from $71,000 in 1905 to $144,891.61 in 1909, or 104 per cent. The cost of tariff indices in 1909 was $15,000. A witness for the Illinois Central at the hearings in the rate advance cases said that the expense incurred in publishing these indices brought the carriers no return and was of benefit only to the Interstate Commerce Commission.

These increases in expenses are undoubtedly typical of increases that have been taking place on all the railways of the United States. It is generally conceded that in the main the tariffs of the railways are in better shape now than they were before the passage of the Hepburn act, but railway traffic officers seem to be unanimously of the opinion that a large part of the increase has been needless and of no benefit to anyone. Members of the Interstate Commerce Commission show a disposition to resent criticisms of their rules for the publication and posting of tariffs. They indicate that the course they have taken is made necessary by the law, and that if the railways do not like it they should get Congress to change the law.

The requirements of the law are, indeed, very specific, but it is provided "that the commission may, in its discretion and for good cause shown, . . . modify the requirements of this section (section 6) in respect to the publishing, posting and filing of tariffs, either in particular instances or by general orders applicable to special or peculiar circumstances or conditions." The commission has modified the requirements in ways which have made the cost of preparing, filing and posting tariffs very much less than it would be if the provisions of the statute were rigorously enforced. It does seem, however, that there are further modifications which the commission might make which would reduce the expenses of the railways without violating the spirit of the law or impairing the facilities afforded to shippers for ascertaining the legal rates. Some changes which many think might properly be made were suggested by this paper in the editorial already mentioned (July 15, 1910, page 111). It is desirable that no steps shall be taken which will interfere with the proper enforcement of the law; but certainly no expense ought to be imposed on the carriers which is not necessary to that end.

Letters to the Editor.

ARBITRATION OF RAILWAY LABOR DISPUTES.

Chicago, April 14, 1911.

To the Editor of the Railway Age Gazette:

The letter from President Delano of the Wabash, in your issue of April 7, 1911, pertaining to the labor situation on American railways, and his suggestion that a permanent court of arbitration should be created for the adjustment of labor disputes, is worthy of the best thought of the interested parties—the owners, the employees and the public.

I will not comment on Mr. Delano's views as to the causes which contribute to the present situation. He finds reason for criticism of labor organization methods, of their increasing financial and economic power without corresponding responsibility to the public which, as he states, must eventually pay the bill. His views, though, are couched in moderate language and reflect his characteristic good temper. A representative of any responsible railway labor organization would, no doubt, from the employees' standpoint, easily justify the prevailing methods as necessary.

Whatever objection may be urged against the present situation, it is my belief that the relations between the companies and their employees are better than they have ever been. If the Interstate Commerce Commission is correct, the carriers were never more prosperous than now, while on the other hand the leaders of railway labor, in emphasizing the success of the organizations, point out that the employees generally work under the best conditions that ever obtained.

As a railway employee, and as a representative of railway employees in one capacity or another for over thirty years, I have been in fairly close contact with labor conditions on American railways. The history of the relations of railways and their employees during this time may be divided into three periods of a decade each.

In the first, beginning in 1880, there prevailed the extreme idea of private ownership which did not acknowledge the right of employees during this time may be divided into three periods of ing relations; this was a period of extra hazardous operation with little or no thought of safety devices or solicitude for what have since become ordinary safety measures. Such organizations of employees as existed were of but little influence; in many instances they were either ignored or actively opposed.

The second period witnessed the development of organized effort among the employees with generally active resistance on the part of the companies and the beginning of the program of the employees to get redress through legislation of their grievances, this being principally directed to the securing of greater safety. The declarations of the employees' organizations almost uniformly were for arbitration during this time, in some instances going so far as to advocate compulsory arbitration, while as a rule the principle was denied by the companies.

The third, and present, period finds the organizations in a highly developed state, representing practically all of the employees of their respective classes, militant, showing in isolated cases an arbitrary disposition, and broadening their legislative program to include measures which the companies claim relate to purely operating conditions and have no direct relation to the safety of the employees or the public. Arbitration is avoided by the employees except as a last resort, or when it is apparent that public sentiment would strongly disapprove of a strike. Now, when the companies are met with a serious wage or other labor situation they usually show a willingness to arbitrate, either under the federal law known as the Erdman act or, as in many instances, voluntarily by mutual agreement with the employees.

It is generally conceded that arbitration is a "safe and sane" method of adjusting disputes, as compared with industrial warfare. I understand Mr. Delano's objection is more to the methods at present employed than to the principle itself. Arbitration is usually the hope of the weaker interest in a controversy. I have represented employees at times and under circumstances when we were quite willing to arbitrate, but our proposals were declined by the companies, evidently because they felt that they were entirely right and should not be compelled to resort to arbitration or, right or wrong, that they could handle the situation. Later on, in the days of greater organization effectiveness, we have as adroitly avoided arbitration as we patiently sought for it in former times; and it would not be unreasonable to say that we were probably moved by the same motives as the companies in our change of attitude.

However, there has been on the part of both the companies and the employees a growing appreciation of the public's rights in the premises; and when a tense situation in a labor dispute is reached neither side is quite as ready to say the final word as it used to be. I believe it can be accepted as a fundamental fact that the public favors fair wages and reasonable working conditions for the employees of the carriers, and that the same reasoning implies that the carriers should be permitted to earn enough to pay good wages as well as to insure a fair return to the stockholders. But public sentiment will not approve of any arbitrary or inconsiderate action on the part of either the employees or the carriers which shall seriously embarrass or prevent the uses for which these highways are created. Therefore, employees, or the labor leader representing them, before declaring a strike of any consequence on any of the great railway systems of this country should be certain that the causes are sufficient and the action justifiable; the companies must also deal with labor crises on the same basis.

It is doubtful if a fixed and permanent court of arbitration, such as Mr. Delano proposes, would bring the remedy that he hopes. To require by law the submission of disputes to such a court would be, in effect, "compulsory arbitration," which I do not believe is desired either by the carriers or their employees. It would mean government control over what is now private right. The United States Supreme Court said in the Adair case that a law passed by Congress prohibiting a carrier from dismissing an employee for joining a labor organization was an invasion of the carriers' constitutional rights. This decision, in effect, established the right of an employer to discharge an employee at will for good cause, or for no cause. Eminent counsel tells us that this same decision implies the right of an employee to quit the service of his employer with or without cause. If such are their rights, then, if required by law, as proposed, to submit their differences to a court of arbitration they might do so, but it would not prevent the employer from discharging all of his employees and filling their places with others, if able to do so, or correspondingly, all of the employees quitting the service of the company at an appointed time and stopping the operation of the road, the effect of which would be the same as a strike.

Even if arbitration were made compulsory a permanent board or court of arbitration would not be without objection. A vital one, the political feature, is mentioned in your editorial. A few decisions regarded as unfavorable by one side or the other would easily furnish the grounds for refusal by the stronger party to submit further cases for adjustment to the court.

The Canadian law requiring conciliation and hearing of labor disputes wherein public service corporations are involved has not operated wholly to prevent strikes on railways, street car lines and in coal mines, which, I understand, come under the law. It might be regarded as significant, though, that in every case where there has been a railway strike following the operation of this law, the employees have emerged from the contest in a more or less battered condition.

It is my belief that eventually the wage rates and the essential working conditions of railway employees will be uniform throughout the country for their respective classes except where influenced by unusual living or operating conditions, and that

no company will be asked to change its wage conditions by its employees, or *vice versa,* until all other carriers similarly affected are placed in the same relation. We are gradually working toward wage uniformity, as in other vital things. It will have its advantages in relieving individual lines and their employees of the constant annoyance of local adjustments, and when a wage matter is taken up for an entire territory it will involve so much for the weal or woe of the contestants, as well as for the public, that the responsibilities of those who deal with these great questions will be so overpowering that settlement of them by means other than resort to strike impresses me as certain.

As long as railways are privately owned they will in some degree be subject to conditions arising out of inherent differences between employer and employee, and in my judgment no artificial measure will permanently eliminate this. Railway companies and railway employees are in a better relation today than they were ten years ago, and ten years hence those relations should be better than they are today as a result of natural development and a higher appreciation of each other's rights.

P. H. MORRISSEY,

President American Railroad Employers and Investors' Association.

THE EFFICIENCY OF RAILWAY EQUIPMENT.

CHICAGO, April 14, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Referring to the editorial in the *Railway Age Gazette* of April 7, on The Efficiency of Railway Equipment, the enclosed statement gives for the fiscal years ending June 30, 1902, to June 30, 1910, inclusive, statistics relating to rolling stock on railways of the United States and its efficiency in amounts, also relatively by years taking 1902 as unity or 100.

From 1902 to 1907 inclusive railway passenger and freight traffic increased annually about 9 per cent., requiring enormous additions to the railway facilities to handle it. According to figures published by the *Railway Age Gazette* during these five years, approximately 28,000 new locomotives, 16,000 new passenger cars, and over 900,000 new freight cars of the heaviest capacity were built to take care of new business, to equip new lines and to replace rolling stock going out of service. Following the fall in traffic subsequent to 1907, the roads naturally found themselves with an abundance of equipment for the traffic offered and were obliged to purchase very little except to replace that retired. This I think is the principal reason for the difference in *miles run* per annum per locomotive or per freight car in 1909 compared with 1902.

Some of the factors influencing utilization of locomotive and car capacity now, as compared with 1902, when statistics of capacity were first reported by the Interstate Commerce Commission, are the following:

LOCOMOTIVES.

1. Increase in traffic density per mile of road with increase in length of trains due to the greater hauling capacity of locomotives resulting in greater delay through loss of time at sidings; passenger train movement, which is given the preference, also increasing in greater ratio than freight.

2. As the lightest class of power is retired from service through obsolescence and new power purchased is naturally of the very heaviest type, it is often necessary to use on branch lines and in local freight and passenger service, locomotives of greater tractive power than are required and larger than the lighter power retired from such service. This excess of tractive power has been found beneficial in such service because it permits prompter and more efficient movement, especially in the case of way freight trains.

3. A part of the decrease shown by the statistics is due to difference in classification of service of the total locomotives in 1909, as compared with 1902. During this period there was an increase of 49 per cent. in the number of freight locomotives and only 29 per cent. in the passenger locomotives. As freight

PERFORMANCE OF LOCOMOTIVES AND CARS—ALL RAILWAYS IN UNITED STATES, YEARS ENDING JUNE 30, 1902, TO JUNE 30, 1910.

		1902.		1903.		1904.		1905.		1906.		1907.		1908.		1909.		1910 (c).	
		Amounts.	Relative.	Amounts.	Relative.	Amounts.	Relative.	Amounts.	Relative.	Amounts.	Relative.	Amounts.	Relative.	Amounts.	Relative.	Amounts.	Relative.	Amounts.	Relative.
	Locomotives.																		
1.	Ton miles freight (millions)	157,289	100	173,221	110	174,522	111	186,463	119	215,878	137	236,601	150	218,381	139	218,803	139	250,418	159
2.	Passengers carried one mile (millions)	19,690	100	20,916	106	21,923	111	23,800	121	25,167	128	27,719	141	29,083	148	29,109	148	33,271	169
3.	Total freight locomotives	23,594	100	25,444	108	27,029	115	27,869	118	29,848	127	32,079	136	33,655	143	33,935	144	.....	...
4.	Total passenger locomotives	10,318	100	10,570	102	11,252	109	11,618	113	12,249	119	12,814	124	13,185	128	13,317	129	.....	...
5.	Total switch and other locomotives	7,313	100	7,857	107	8,462	116	8,870	121	9,575	131	10,495	144	9,893	135	9,960	136	.....	...
6.	Total locomotives	41,225	100	43,871	106	46,743	113	48,357	117	51,672	125	55,388	134	56,733	138	57,212	139	57,359	139
7.	Total pounds locomotive traction (b) (millions)	845	100	950	112	1,067	126	1,144	135	1,278	151	1,430	169	1,521	180	1,524	180	1,547	183
8.	Total freight and mixed train miles (millions)	531	100	558	105	587	111	579	109	627	118	662	125	622	117	605	114	659	124
9.	Total passenger train miles (millions)	406	100	425	105	440	108	460	113	479	118	509	125	506	125	506	125	534	132
10.	Ton miles per freight locomotive (thousands)	6,666	100	6,808	102	6,457	97	6,691	100	7,233	109	7,376	111	6,449	97	6,448	97	.....	...
11.	Passenger miles per passenger locomotive (thousands)	1,908	100	1,979	104	1,948	102	2,049	108	2,055	108	2,163	113	2,206	116	2,186	115	.....	...
12.	Average traction per locomotive (pounds)	20,485	100	21,781	106	22,804	111	23,666	116	24,741	121	25,823	126	26,356	129	26,634	130	26,962	132
13.	Tons freight per train	296	100	311	105	308	104	322	109	344	116	357	121	352	119	363	123	380	128
14.	Passengers per train	45	100	46	102	46	102	48	107	49	109	51	113	54	120	54	120	59	131
	Cars.																		
15.	Passengers carried one mile (millions)	19,690	100	20,916	106	21,923	111	23,800	121	25,167	128	27,719	141	29,083	148	29,109	148	29,109	148
16.	Passenger cars (a)	36,987	100	38,140	103	39,752	107	40,713	110	42,262	114	43,973	119	45,117	122	45,584	123	45,953	124
17.	Ton miles freight (millions)	157,289	100	173,221	110	174,522	111	186,463	119	215,878	137	236,601	150	218,381	139	218,803	139	250,418	159
18.	Tons freight car capacity (a) (thousands)	43,391	100	48,531	112	50,759	117	53,255	123	59,059	136	67,033	154	73,087	168	73,137	169	73,304	169
19.	Total freight cars (a)	1,546,101	100	1,653,782	107	1,692,194	109	1,731,409	112	1,837,914	119	1,991,557	129	2,089,302	135	2,073,606	134	2,091,491	135
20.	Total freight car miles (millions)	13,340	100	14,194	106	14,354	108	15,082	113	16,590	124	17,122	128	16,857	126	17,169	129	18,772	141
21.	Ton miles per freight car (thousands)	102	100	105	103	103	101	108	106	117	115	119	117	105	103	106	104	120	118
22.	Average tons capacity per freight car	28.08	100	29.40	105	30.06	107	30.83	110	32.21	115	33.75	120	34.87	124	35.31	126	35.05	125
23.	Average tons freight per loaded car	16.92	100	17.60	104	17.72	105	18.14	107	18.92	112	19.68	116	19.62	116	19.26	114	.....	...
24.	Box cars of capacity of 40 tons or more	42,901	100	70,180	164	83,884	196	104,645	244	144,148	336	204,974	478	252,653	589	262,909	613	.....	...

(a) Excludes privately owned cars, such as Pullman cars, private freight cars, etc. Statistics for 1908, 1909 and 1910 exclude switching and terminal companies. Statistics for 1902 to 1909 from I. C. C. Statistics of Railways of United States.

(b) Ratably increased to include unclassified equipment.

(c) Based on returns to Bureau of Railway News and Statistics, covering about 97 per cent. of the entire traffic in the United States.

locomotives are very much heavier than passenger, and operate at lower speeds, the effect of this is unduly to increase the average tractive power of all locomotives.

4. In passenger service the increased weight of cars and the large number of high speed trains have consumed a considerable part of the locomotive tractive power as compared with former conditions.

So far as utilization of locomotive efficiency in hauling trains is concerned, it is reasonable to conclude, from consideration of the above factors in connection with the statistics presented, that there has been no material loss in locomotive efficiency. Comparing 1910 with 1902, the freight train load increased 28 per cent., passenger train load 31 per cent., and average tractive power of locomotives 32 per cent., which latter increase would have been somewhat less if the classification of locomotives as to passenger and freight service had remained unchanged. There has been, however, a greater percentage of increase in the total number of locomotives than in the total train mileage. Improvement in utilization of locomotive capacity in hauling tonnage could be best effected through general adoption of improved methods of tonnage rating, and particularly through the avoidance of uneconomical and unnecessarily high speeds in conducting freight traffic, which decrease train tonnage and are often of doubtful utility in reducing time between terminals through offsetting increased delay at meeting points because of the increased train density required to move a given traffic.

PASSENGER CARS.

Statistics of gross weights of passenger cars and passenger car mileage are not available, but average car weights have materially increased. Comparing 1910 with 1902, however, an increase of 48 per cent. in the number of passengers one mile was handled with an increase of only 24 per cent. in the number of passenger cars reported.

FREIGHT CARS.

In 1910, as compared with 1902, ton mileage of freight increased 59 per cent., total cars owned increased 35 per cent., total car capacity increased 69 per cent., total car mileage increased 41 per cent. Following the fall in freight traffic subsequent to 1907, miles run per total car owned were reduced because of the surplusage of car equipment not needed for traffic. According to the reports of the American Railway Association, a shortage of 150,000 cars in the early part of 1907 was turned into a surplusage often amounting to over 300,000 cars in the following two years. Notwithstanding a surplus of equipment still existing in 1910, miles run per car were greater than in 1902. Car efficiency as reflected by comparison of average tonnage capacity with average load has, however, decreased, due principally to the following causes:

1. As average capacity increases beyond the limits measuring the amount of freight to which carload instead of less than carload rates apply, the difficulties of utilizing the additional capacity increase and the opportunities for fully loading equipment to capacity decrease. At smaller stations limited amounts of tonnage are frequently offered for transportation that could be put into a car of small capacity when only cars of large capacity are available. The transportation of less-than-carload freight and of way freight is generally independent of average capacity, and with this traffic only a small proportion of the weight capacity of the larger cars can be utilized.

2. In the case of open cars weight capacity can nearly always be fairly well utilized. With box cars, as well as stock and refrigerator cars, the loading capacity with certain bulky commodities is measured by the space capacity and the difficulty of utilizing the weight capacity increases greatly with cars of 40 tons marked capacity or over. With the use of more powerful locomotives the strength and weight of freight cars has necessarily been increased, while the marked capacity has been increased very much more proportionately, although the cubic capacity could not be increased to the same extent. Some of the larger box cars have a marked capacity of 50 tons, or 67 per cent. in excess of former standard 30-ton capacity cars, while the weight of the larger cars is only 32 per cent. greater. It is unfair to measure the efficiency in use of such equipment altogether on the basis of ratio of marked capacity to load, as while these large cars cannot be fully loaded with some commodities, their full weight capacity can be utilized when loaded with heavy freight, so that when their use effects an increase in the *average load* beyond the proportionate increase in *dead weight*, an increase in efficiency has been realized regardless of the marked capacity of the car.

There has been an extremely large increase in box cars with marked capacities of 40 tons or more since 1902. Cars of this class, which are those for which loading to weight capacity is most difficult, were six times as numerous in 1909 as in the earlier year.

The introduction of the large capacity cars has increased the range in carload capacity between the largest and the smallest cars, but with the elimination of the smaller capacity cars improved loading should result if increases in minimums at which carload rates apply are made whenever possible. Increases in efficiency must otherwise be found by eliminating all unnecessary empty haul and through increasing average daily mileage through methods that will eliminate unnecessary delay at terminals.

As suggested by the *Railway Age Gazette*, all shippers of freight should co-operate with the railways in securing methods of increasing efficiency of rolling stock.

W. A. WORTHINGTON,
Assistant to Director of Maintenance and Operation, Harriman Lines.

Chicago, April 10, 1911.

To the Editor of the Railway Age Gazette:

I have read with interest your editorial on The Efficiency of Railway Equipment, in the issue of April 7, and, while it suggests an important investigation, I do not think the methods used are entirely correct; and the figures will hardly be accepted as accurate. The assumption that the average tractive power of freight and passenger locomotives is the same is so far from correct that it vitiates all calculations based on it. I should say that the average tractive power developed by freight locomotives is 50 per cent. greater than that developed by passenger locomotives, and 20,000 lbs. might be taken as the average for passenger and 30,000 for freight locomotives. This difference is much greater now than it was in 1902.

Your figures show that from 1902 to 1907 there was an increase of 20 per cent. in the average tons per train and of 11 per cent. in the ton miles per freight engine per year, and comparison shows a tendency in the right direction, even if not as pronounced as should be expected.

Comparisons of statistics of the year 1902 with those of 1907 and 1909 are not very satisfactory, as the conditions in the two latter years were abnormal and not sufficiently representative to make the comparisons instructive. In 1907 there was such a congestion of freight traffic that it could not be moved under favorable conditions, and yards and terminals were so far unequal to the requirements that trains were moved under light tonnage and engines not credited with the tonnage they were capable of hauling. During 1907 and 1908 a large number of heavy locomotives were built, and in 1909 this equipment was available for service, but the amount of traffic offered to the railways had decreased and the tonnage handled per engine was unduly light.

The use of the item "ton miles per pound freight locomotive tractive power per year," makes a showing of a decrease of 31.3 per cent. in efficiency between 1902 and 1909, and, while such a unit may be useful as suggesting the general trend, it cannot be accepted as an accurate index for measuring the economic value of large locomotives. The same is true of the item "ton miles moved per year per ton of car capacity," which shows a decrease of 19½ per cent. for 1909 compared with 1902. Suppose a

given tonnage is moved in a certain number of 20-ton cars in one year and in the same number of 40-ton cars in another year. To divide this tonnage by the car capacity in each case would show a loss in efficiency for the heavy car of 100 per cent., which would indicate that the use of such a unit in these comparisons is not a practical one. The cars haul the same tonnage in each case, and the real loss is only that due to the interest on extra first cost and the extra dead weight hauled, which we know would hardly amount to 10 per cent.

Coming now, to the final conclusion, that shippers should cooperate in making maximum carload weights and in modifying demurrage rules so that the road could get the maximum reasonable results for their large equipment. So far as the railway has provided the large capacity cars and locomotives to satisfy the clamor of the shipper for large shipping facilities, there is some merit in this suggestion. But so far as the providing of large equipment has been overdone the shipper will properly decline to make any sacrifice in helping to correct the mistakes of the railway. In England freight is handled in 10-ton cars and the shipping facilities and schedules are based on them. If, now, the railways say, "We will increase the capacity to 30 or 40 tons," as they do in America, the shipper would have to change warehouses, storage tracks, etc., and would not have as frequent or as fast service as at present, and he would, therefore, not be inclined to meet the railways in their demands.

I believe that the general average figures covering all the railways in the United States, as used in your tables, cannot be made to show any definite results for increase in capacity of equipment, but they must be worked out for each road or system separately. It is probable that on some roads the capacity of freight locomotives and cars has already exceeded the economic requirements and the greatest value to be derived from your statistics is the suggestion which would lead each manager to study the subject on his own road and find out what is actually needed, instead of blindly following other roads whenever new equipment is necessary.

MOTIVE POWER.

The Swiss state railways in 1910 earned 7 per cent. more than the year before, while the expenses were 0.4 per cent. less, and the resulting increase in net earnings was $2,410,000.

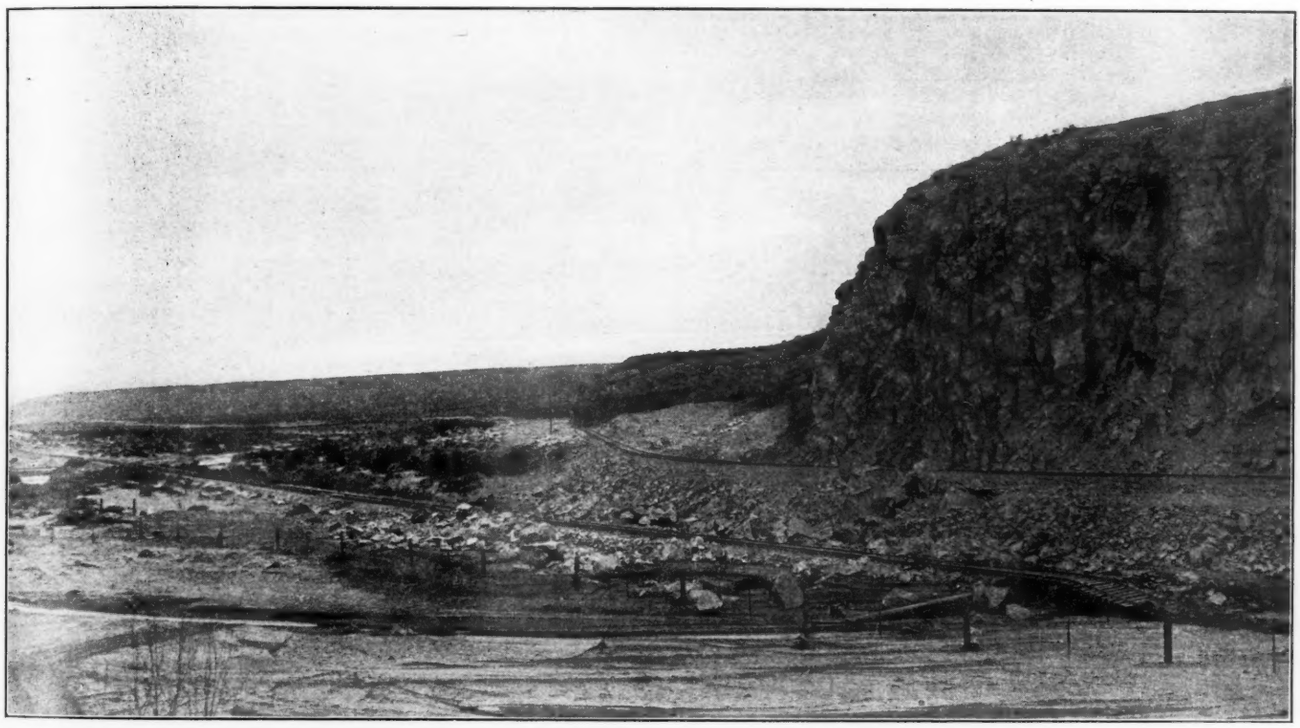
REBUILDING THE SALT LAKE ROUTE.

BY H. M. M'CARTNEY.

To understand the conditions with which the San Pedro, Los Angeles & Salt Lake has to contend, culminating with the washout last year, it is necessary to review the history of the location of the line.

In 1888 the Union Pacific took up the question of extending its Utah line to southern California. This company, by means of leased lines, had reached deep water navigation at Portland, Ore., and was meditating an extension to Puget Sound which should run along its eastern shore to the Canadian boundary. It was decided to see what could be done toward an extension southward from Utah to reach the Los Angeles region, the line not only to have an ocean port there but to be pushed on to San Diego. This with the northern extension would give a continuous track from the Mexican to the Canadian frontier—a daring conception which subsequent developments have shown to be entirely warranted.

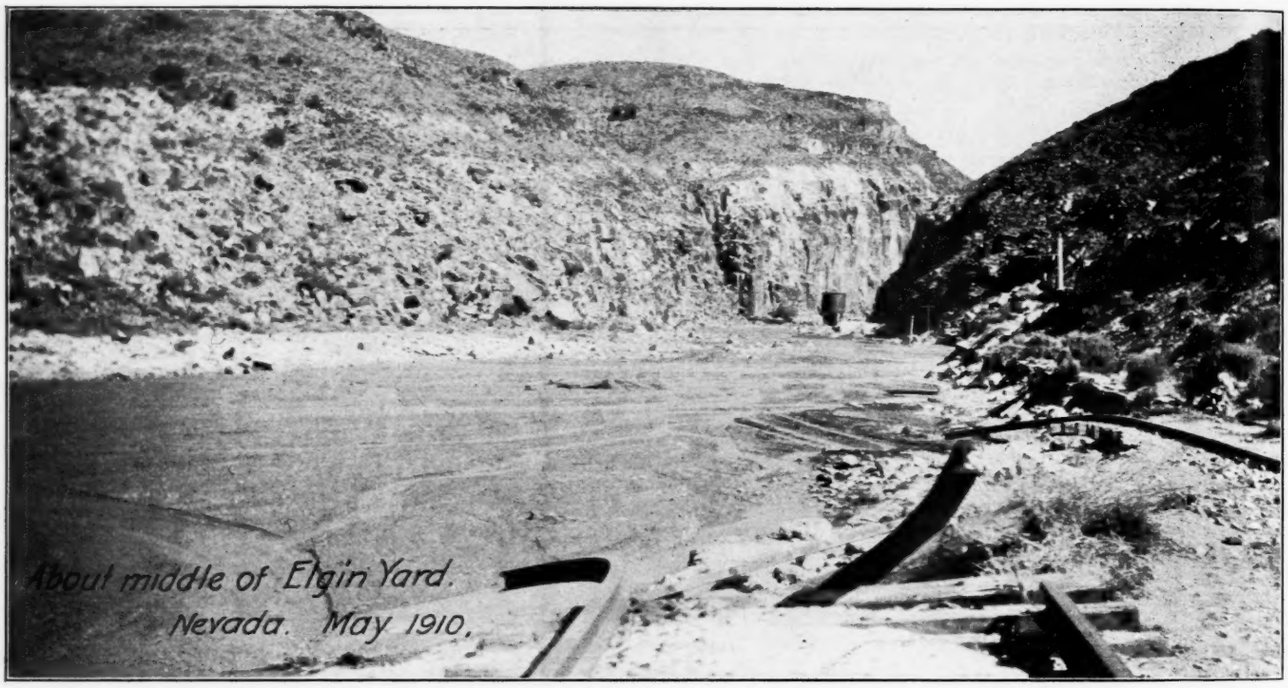
The Union Pacific had recently come into control of the lines



Old and New Lines Near Guelph.

south of Salt Lake City whose terminus was at Milford, Utah, 222 miles distant by rail. Milford was inside of the Salt Lake basin—the curious region now without a drainage outlet which at its overflow stage contained a lake 300 miles long and about the same size as Lake Ontario, whose waters, nearly 1,000 ft. deeper than the present lake, reached the Pacific Ocean by way of the Snake and Columbia rivers. The first point for the engineers was to find a practicable pass in the southern rim of the basin, which was about 80 miles from Milford. Several passes were speedily found which did not vary much in elevation. They were about 1,000 ft. higher than Milford and could all be reached on 1 per cent. grades. The next objective point was a continuous line of drainage starting in the vicinity of Freiburg, Nev., and extending by way of the Pahranagat and Moapa valleys and the Virgin and Colorado rivers all the way to the Gulf of California. This drainage, at a point where a line in the righ direction from Milford would intercept it, was about 100 miles from the rim of the basin and 4,400 ft. below it. This drainage must be crossed. The problem, therefore, was to select a pass from which a descent could best be made to

the drainage. It was soon ascertained that the natural gradient on the south side of the passes was 2 per cent., which gradually flattened to 1.5 per cent. and then to 1 per cent. After many months of examination it was found that nature had graded a pathway from one of the passes to the drainage by way of a route called the Meadow valley. This could be reached by a tributary called the Clover valley, which headed in one of the lowest passes, the two valleys giving a continuous water grade 113 miles long, and terminating at the Moapa river, directly opposite the mouth of a dry valley or wash, which led up to the next summit to the south. After the contour maps of the region were completed, there was never any question as to the route. The Meadow valley had no competitors. It ran in the right direction, cut through three mountain ranges, and afforded the same grades which were necessary on any of the other routes. In detail, the Meadow valley was not very discouraging. Most of it was a close canyon with rocky sides, but there was usually room enough between the foot of the slopes and the edge of the stream bed to hold a road. There were only 20 miles of the 113 which necessitated any heavy construction work.

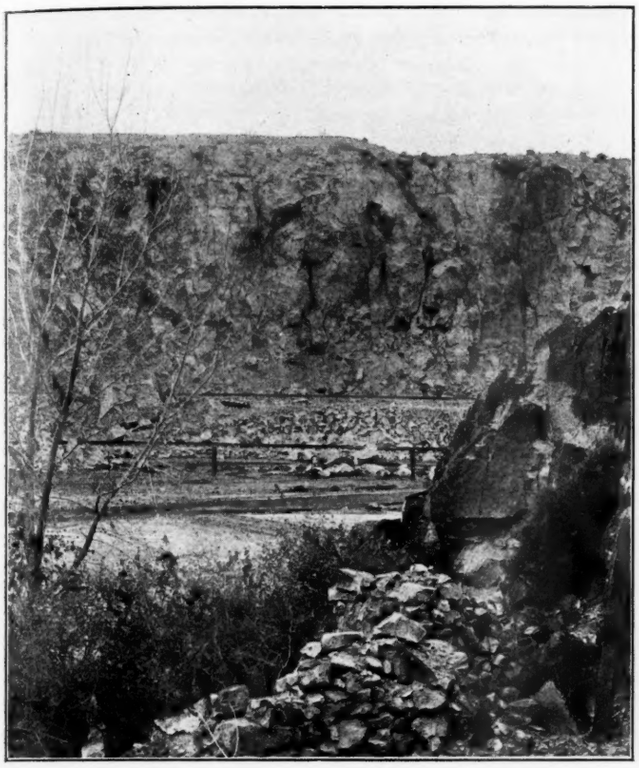


Washout of Elgin Yard; San Pedro, Los Angeles & Salt Lake.

Most of this was near the summit and required six short tunnels, which aggregated 2,600 ft. in length. There were no high trestles and, at the outset, no bridges. For the greater part of the year the small creek which occupied the bed of the Clover and Meadow valleys disappeared beneath the sands for most of the distance. Frequently for years at a time there were 100 miles of the 113 where not a drop of surface water could be obtained. In the whole length of the valley there was but one small wagon road bridge. One disgusted traveler who had been compelled to make a dry camp in the creek bed, expressed his feelings by painting on a large white granite boulder: "The longest, the dryest, and the damnedest wash on earth." In the whole length of the two valleys there were some twelve settlers whose ranches had been cultivated since 1876 without any trouble from high water except such as occurred near the southern end from occasional cloudbursts which came down from the surrounding mountains during the hottest months of the summer. Such were the conditions which confronted the locating engineers in 1889. The line was located along the edges of the channel in most places and pile trestles laid out for crossings. The 32 miles in the Clover valley were graded in 1890 but no track was laid. The bankruptcy of the Union Pacific stopped this work. When it was resumed in 1901 the project was in the hands of the San Pedro, Los Angeles & Salt Lake, in which the Union Pacific took a one-half interest. In the 11 years which had elapsed there had been no floods. The abandoned grading was intact. Many of the earth embankments built in the edges of the channel had not been rip-rapped, but were uninjured. Down the main Meadow valley the cedar stakes of the engineers stood where they had been placed in 1890. Th location made in that year was practically adopted, the grading was resumed and the track reached the lower end of the Meadow valley in June, 1904. There was nothing in the known history of the valley since 1876 which presaged any disaster. The whole line was completed in 1905.

In 1906 there came a small flood which did a little damage and closed the road for two weeks. Then in 1907 came the highest water ever known. It damaged the line so badly as to cause it to be closed for six weeks. Several trestles crossing the channel were destroyed and miles of embankment were undermined. The company raised the grade in places, protected the exposed embankments with 34 lineal miles of heavy rip-rap and put in 8 steel bridges where the trestles had been destroyed. It also changed so much of the creek channel that it was the saying that the engineers had re-located the creek instead of the railway. Apparently everything had been done to withstand any high water which could be expected. Nothing happened in 1908. In December, 1909, there came an unusually heavy fall of snow which covered the entire mountain range at the rim of the Salt Lake basin and extended southward nearly to the California line. The drainage basin of the Meadow valley is an immense one, but under ordinary conditions the snow would have gone off gradually and probably done little or no damage to the recently strengthened roads. But on January 1, 1910, there came a tremendous storm of warm rain which in itself would have made trouble, and which turned to water the entire snowfall in one night. The result was the greatest flood ever known in that region. It was all over in 24 hours, but in that short time it had closed 89 miles of railway, of which 23 miles of main line in various pieces and 6 miles of sidings and Y's were totally destroyed. This portion of the road remained closed until June 13, 1910.

The volume of water at its maximum was five times greater than any before known. The flow attained a velocity of 20



Old and New Lines Near Rox.

Condition of Road Near Kyle, in May, 1910.

miles per hour in some places. The bed of the stream on steep grades was scoured down 5 to 15 ft. and in flat places was raised 5 to 8 ft. The deepest water was 15 ft., but this was in a narrow part of the canyon and was moving on a grade of 79 ft. per mile.

The water carried so much silt that in many places rails which were partially buried had their exposed portions polished as bright as if held on an emery wheel. The force of the water was terrific. Rocks weighing 2,000 lbs. were washed from the creek bed up onto the track and left there. A large tonnage of rails disappeared altogether. In sinking a coffer dam on the new works a rail was recently found 9 ft. below the bed of the

Pile Trestle Carried Away After Debris Had Banked Up Against It.

Debris Left on Track Where Water Was Shallow; San Pedro, Los Angeles & Salt Lake.

stream. Hundreds of rails were bent so as to be ruined.

At Caliente a dyke had been built to protect the engine terminal. The flood broke this and filled the roundhouse and turntable pits with sand and raised the general level of the yards. The roundhouse was substantially built of brick, but a breach 110 ft. wide was made in it.

The drift and ice blocked the trestles and dammed up the water. When enough had accumulated it would tear the trestle out bodily, everything going down in a mass against the next trestle and often taking it out in an instant. Of the trestles crossing the channel 36 were totally and 50 partially destroyed. The 8 steel bridges fared better. One was upset and buried 13 ft. in the sand. Two had an abutment each undermined but were saved and put back into position. The other five were not damaged. About 3 lineal miles of rip-rap were destroyed. Part of this was undermined and part cut out from the top by water which accumulated and finally came over the bank. Ties which were torn from the rails went all the way to the Colorado river. In one place the main track retained its shape but a siding was bent around 180 degs. and washed under the main line. Many of the ranches in the Meadow valley were nearly ruined. In some places the fields were washed out, in others they were covered with sand.

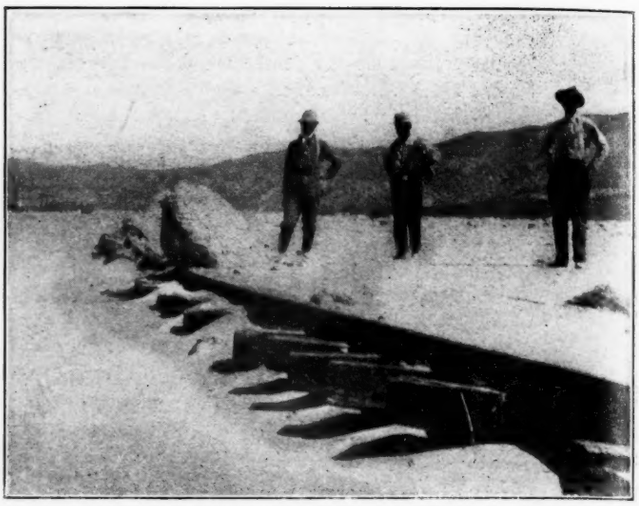
One freight train was caught by the flood and was unable to move either forward or back. The embankment on which it stood was gradually undermined and the engine and train were overturned. The crew escaped, but 36 horses were drowned

Overturned Bridge.

and 28 cars destroyed. One steel gondola was carried nearly a mile down stream. Part of its lading was light structural steel and much of this was ruined by being twisted around rocks in the channel, some being bent 180 degs. Tinware and fire extinguishers were carried for long distances. One carload of a popular breakfast food was strewn along the banks for 50 miles. The proprietors missed a chance for a series of photographs showing how widely their product was distributed.

A passenger train was also caught, but fortunately was on a high rocky shelf where it was not injured. The passengers were removed the next day in wagons, but the train was compelled to wait for the rebuilding of the road and eventually reached Salt Lake City under its own steam some 150 days after it left Los Angeles, probably the most belated train on record.

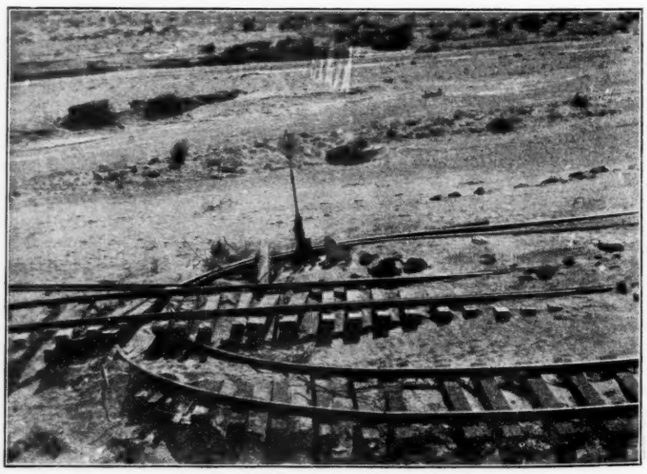
The company met the situation with great energy. A short time was devoted to considering alternate lines, but the decision made in 1899 was adhered to and the Meadow valley route retained. The first step was to provide a temporary line for the resumption of business. This was done by closing the gaps partly with grading and partly with trestles. Altogether 26,000 lineal feet of pile trestles were built. The banks were protected by sand bag rip-rap. The entire work was completed in 75 days at



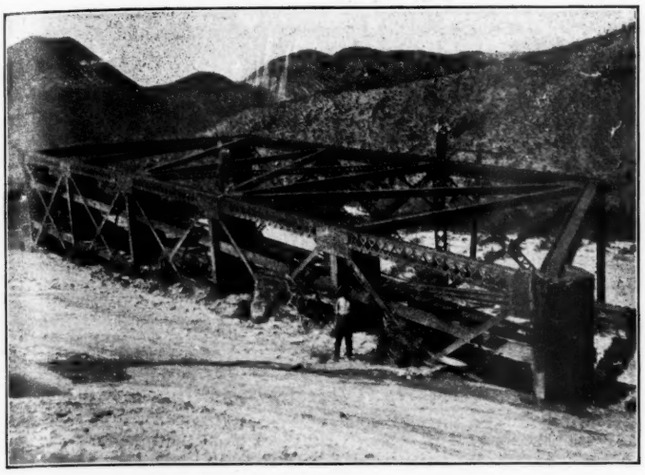
Boulder Left on Track.

a cost of about $500,000, and train work immediately resumed. In the meantime, a new line had been located along the slopes of the valley 8 to 12 ft. above the high water line of 1910, and 68 miles of it from Caliente westward were put under construction last fall. In this distance 6 miles of old grade were used. The rest is all new location. The grading involved much heavy rock work and 8 tunnels, aggregating 4,201 ft., yet it was all practically finished in the surprisingly short time of 150 days, a monument to the energy of Chief Engineer E. G. Tilton. About 40 miles of track were laid by April 1. In the new line both alinement and distance are sacrificed to safety. The distance is nearly two miles longer than the old line. The maximum curve is 8 degs. No change has been made in the former maximum grade of 1.5 per cent. The equation for curvature is 0.04. The tunnels are 17 ft. x 23 ft. in the clear, and they are lined with timber which is protected against fire by a covering of galvanized sheet iron. All the tunnels were dry.

The greatest care has been taken with the crossings of the channel, which are 15 in number on this 68 miles and are all to be steel bridges. The longest are 300 ft., composed of 3 spans of 100 ft. each. The riveted spans are 100 and 125 ft. The plate girders are 90 and 100 ft. There is but one deck bridge among them. The piers and abutments are sunk to bed rock or hard gravel wherever possible. Where this cannot be done they are excavated to a minimum depth of 12 ft. and then piled. Pile trestles are used across side gulches only. The spans are 15 ft. and the ballast decks are supported by eleven stringers 8 x 16-30. The piles are all creosoted.



Siding Twisted under Main Track.



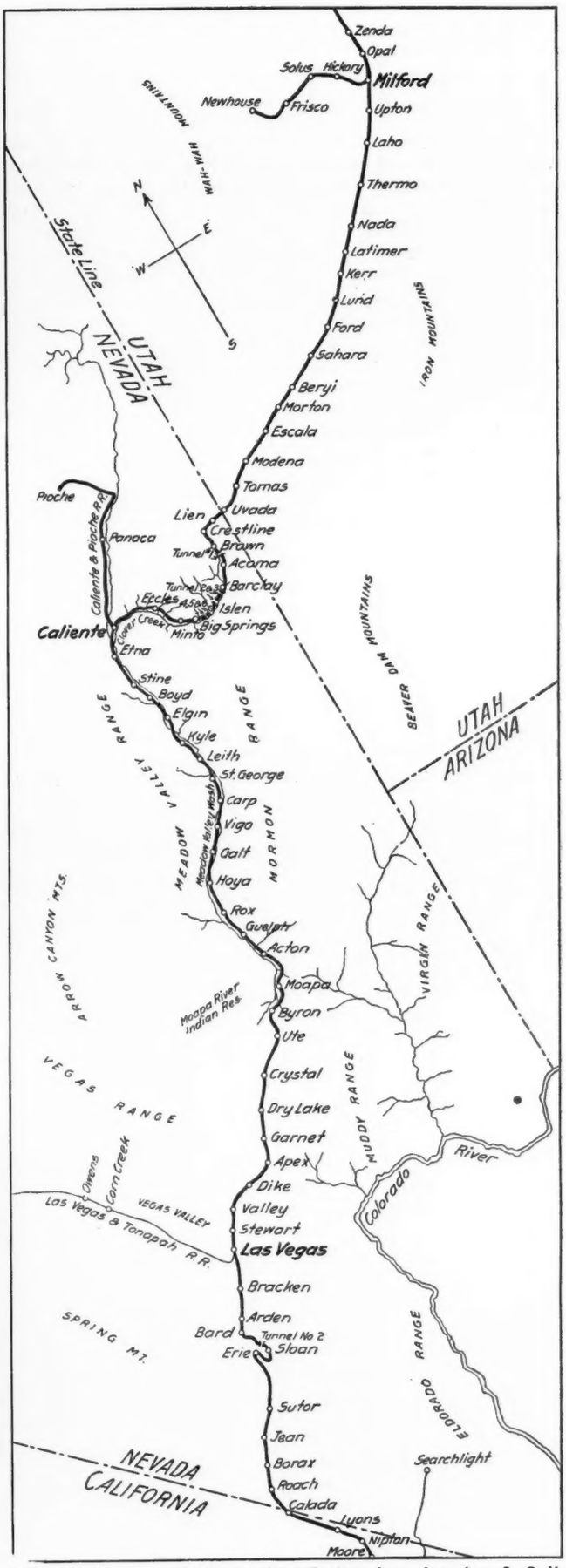
Bridge Swept from Abutment.

There are a few 10-ft. openings which are made with plain concrete end walls and flat decks of rails embedded in concrete. Culverts are of continuous concrete pipe. There are several concrete retaining walls, of which the largest is 400 ft. long and 18 to 20 ft. high. Miles of heavy rip-rap have been put in.

New Station at Las Vegas.

The old track was composed of 75-lb. rail and 7-in. x 8-in. ties. The new track has 85-lb. rail, A. S. C. E. section, with 7-in. x 9-in. ties laid 18 to the 33-ft. rail. All the ties are Oregon fir and burnettized. Continuous rail joints are used, weighing 71 lbs. The entire line is tie plated with 8-in. x 8½-in.

Gondola Washed Down-Stream.



Line South from Milford; San Pedro, Los Angeles & Salt Lake.

standard flat Harriman plates weighing 6½ lbs. each. The standard frog is number 9. Standard water tanks are of steel and 70,000 gal. capacity. The road uses oil for fuel on all of its lines except the easterly 200 miles. At Caliente is a steel storage tank holding 30,000 barrels. All of this work in progress is west of Caliente. East of that point work has been started on 12 miles of grading, 1½ miles of which will occupy the old roadbed and 10½ miles will be on new alinement which will involve much heavy grading and two tunnels, 400 and 1,300 ft. in length, and 8 steel bridges. The total work to fight the Meadow valley flood will be 72½ miles of new grading and 80 miles of new track. The total new tunnels will be 10 in number, aggregating 5,901 ft., and the total steel bridges will be 23, aggregating about 4,715 ft. in length and calling for more than 5,000 tons of steel.

Altogether the work will cost over $5,000,000, and all of it is for protection against a desert stream which is practically dry for years at a time and whose greatest devastation occurred in 24 hours. By next winter the work will be completed and the officials of the company will feel their property is secure against further disaster. And what will the Meadow valley creek do? Will it repeat its tactics of 1910 and make one final effort for supremacy, or will it sulk along as it did for the thirty years from 1876 to 1906?

TRAIN ACCIDENTS IN MARCH.*

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of March, 1911. This record is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation.

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd.	Inj'd.
6.	Delaware & Hudson..	Oneonta.	rc.	F. & F.	2	0
*11.	Boston & Maine.....	Greenfield.	rc.	F. & F.	1	3
15.	Atchison, T. & S. F..	Glendora.	bc.	P. & P.	0	2
16.	Southern	Aiken.	xc.	P. & F.	0	8
20.	Atchison, T. & S. F..	Kingman.	ms.	P. & P.	2	2

Derailments.

Date.	Road.	Place.	Cause of derailmt.	Kind of Train.	Kil'd.	Inj'd.
1.	Houston & T. C.....	Corsicana.	malice.	P.	2	0
3.	Mo., K. & Texas.....	Brookshire, Tex.	unx.	P.	0	0
5.	Southern	Bearden.	unx.	P.	0	8
8.	Augusta So.	Wren. (ag. spl.)	unx.	P.	0	2
13.	Central N. J.....	Penn Haven J.	derail.	F.	1	1
14.	Baltimore & Ohio....	Alberton.	slide.	F.	0	5
*22.	Boston & Maine.....	Clinton.	unx.	P.	0	2
†25.	Atlantic C. L.....	Alapaka.	b. axle.	P.	10	10
27.	Chicago G. W.....	Cannon Falls.	d. track.	P.	0	2
*28.	Del., L. & W.....	Tully.	b. rail.	P.	0	5
29.	Penn.	Spruce Creek.	unx.	P.	0	0
29.	Ill. Central	Dubuque.	slide.	P.	0	1

Other Accidents.

Date.	Road.	Place.	Cause of Accident.	Kind of Train.	Kil'd.	Inj'd.
9.	Mo., K. & Texas.....	Durant, Okla.	fire.	F.	0	0

The derailment at Alapaha, Ga., on the 25th, occurred on a trestle bridge, and six passengers and four trainmen were killed, and nine passengers and one express messenger were injured. Some of the victims were drowned. The derailment was caused by the breaking of a driving wheel axle, and the trestle was destroyed for a length of about 400 ft. This accident was reported in the *Railway Age Gazette*, March 31.

The derailment at Corsicana, Texas, on the 1st, was caused by a large cast iron washer placed on the rail. That the washer did not come there accidentally was shown by the testimony of a farmer living nearby, who said that about a week prior to the derailment he had picked up this washer from the center of the track and had thrown it into the weeds several yards to one side.

The train derailed at Wren, Ga., on the 8th, was the "Agricultural Special," carrying lecturers from the State Agricultural College. The engine was running backwards and the tender was the first vehicle to leave the track. The engine, crowding on the tender, was overturned and fell down a bank. The tender was the first vehicle to leave the track also in the derailment at Bearden, Tenn., on the 5th, on the Southern railway, and at Clinton, Mass., on the Boston & Maine, on the 22d. At Bearden it is said that the train was running at about 40 miles an hour and all of the cars in the train ran off the track, except one at the rear. Most of the passenger cars were ditched and fell against the side of an embankment. At Clinton, one passenger car fell down a bank, but the passengers in it numbered only 3.

The train which was damaged by fire at Durant, Okla., on the 9th, was one carrying troops to Texas and a carload of horses was destroyed. The report that two soldiers were killed as a result of the fire appears to have been unfounded.

The derailment at Penn Haven Junction, Pa., on the 13th, was at the approach to the Lehigh Valley crossing, and the locomotive and five cars fell into the Lehigh river.

Of the 10 electric-car accidents reported in the newspapers as occurring in the United States in the month of March, one at Buffalo, N. Y., on the 19th, resulted in the death of two persons and the injury of four. In this case a locomotive ran into a street car on a crossing and wrecked the car, but it was occupied by only three passengers. One rear collision occurred in Indiana, a state in which public opinion is sensitive on the subject of collisions because of a number of disasters on interurban lines in that state last autumn. In the present case a freight car became disabled and the conductor went forward to flag a passenger car, but was utterly unable to attract the attention of its motorman.

Near Bluejay, Ont., on the Canadian Pacific March 25, a butting collision between a westbound colonists' train and an eastbound freight resulted in the death of three trainmen.

* Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

MALLET LOCOMOTIVES FOR THE CHICAGO, MILWAUKEE & ST. PAUL.

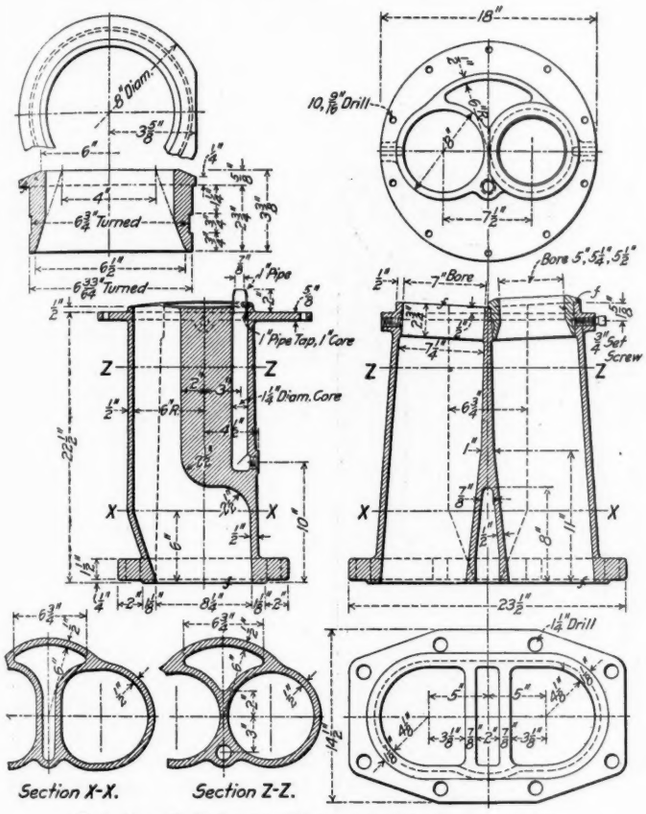
Twenty-five Mallet locomotives have recently been built for the Chicago, Milwaukee & St. Paul by the American Locomotive Company. Part of the number are to be used on that railway and the rest on the Puget Sound line. Seventeen of the order are designed for burning coal and the other eight for burning oil as they are to be used on divisions in the Idaho Forest Reserve. The locomotives have a theoretical hauling capacity of 900 tons at a speed of 6 to 8 mi. per hr. on a 2.7 per cent. grade, the tonnage being based on 5 lbs. per ton resistance for cars; they are to be used in pusher service for both the passenger and freight trains.

These locomotives are similar in general design to the 2-6-6-2 type built for the Chesapeake & Ohio, and described in the *Railway Age Gazette* of December 16, 1910. They are of very nearly the same weight, but the Chesapeake & Ohio locomotives have a rated tractive effort of 82,000 lbs., which is 7,000 lbs. greater than for these engines. This difference is accounted for by the following dimensions of the two engines; the Chesapeake & Ohio has 22 in. and 35 in. x 32 in. cylinders, 225 lbs. boiler pressure and 56 in. drivers; the Chicago, Milwaukee & St. Paul locomotives have 23½ in. and 37 in. x 30 in. cylinders, 200 lbs. boiler pressure and 57 in. drivers. The boilers of the two locomotives are almost identical. In both, the tubes are 24 ft. long and 2¼ in. in diameter. There is a long combustion chamber which brings the firebox back of the rear driving wheels and gives a good depth of throat sheet. In the newer locomotives the distance from the top of the grate to the lowest tube is 24⅛ in. The Chesapeake & Ohio locomotives have 401 tubes, while these engines have 439, which give them 536 sq. ft. more heating surface.

A separate exhaust pipe is provided for each low pressure

cylinder. This new feature is illustrated herewith and was incorporated with the idea of reducing the back pressure in the low pressure cylinders. Although this construction increases the number of joints, it is not considered a serious objection, in view of the advantages claimed for it. The trailing truck was made in accordance with the design developed by J. F. De Voy, assistant superintendent of motive power of the Chicago, Milwaukee & St. Paul, which has been adopted as a standard by the road.

Except for the necessary modification required in the construc-



Details of Exhaust Pipe; Mallet Locomotive.

tion of the firebox, ash-pan, exhaust pipe and tender, due to the use of oil as fuel, the oil and coal burning locomotives are identical in design. These changes make a difference in the total weight of the engine of 2,500 lbs. The locomotives equipped for burning coal have a total weight of 390,000 lbs., while those arranged for burning oil have a total weight of 387,500 lbs. Between the weights of the tenders of the two classes of engines there is only a difference of 700 lbs. in favor of the oil burning class. Following are the principal ratios and dimensions of the coal burning locomotive:

General Data.

Type	2-6-6-2
Service	Freight
Fuel	Bit. coal
Tractive effort	75,000 lbs.
Weight in working order	390,000 lbs.
Weight on drivers	323,500 lbs.
Weight of engine and tender in working order	555,700 lbs.
Wheel base, driving	30 ft. 6 in.
Wheel base, total	48 ft.
Wheel base, engine and tender	79 ft. 8¼ in.

Ratios.

Total weight ÷ tractive effort	5.2
Weight on drivers ÷ tractive effort	4.31
Tractive effort × diameter drivers ÷ heating surface	652.
Total heating surface ÷ grate area	90.6
Firebox heating surf. ÷ total heating surf., per cent.	5.28
Weight on drivers ÷ total heating surface	49.3
Total weight ÷ total heating surface	59.5
Volume equivalent simple cylinders, cu. ft	22.9
Total heating surface ÷ vol. cylinders	286.5
Grate area ÷ vol. cylinders	3.15

Cylinders.

Kind	Compound
Diameter	23½ in. and 37 in.
Stroke	30 in.

Valves.

Kind	Piston and slide
Travel	6 in.
Steam lap	1 in. and ⅞ in.
Lead, forward gear	3/16 in.

Wheels.

Driving, diameter over tire	57 in.
Driving, thickness of tire	3½ in.
Driving, journals, main, diameter	10 in. x 13 in.
Driving, journals, others, diameter	10 in. x 13 in.
Engine truck, diameter	33 in. Paige
Engine truck, journals	6½ in. x 12 in.
Trailing truck, diameter	43 in.
Trailing truck, journals	8½ in. x 14 in.

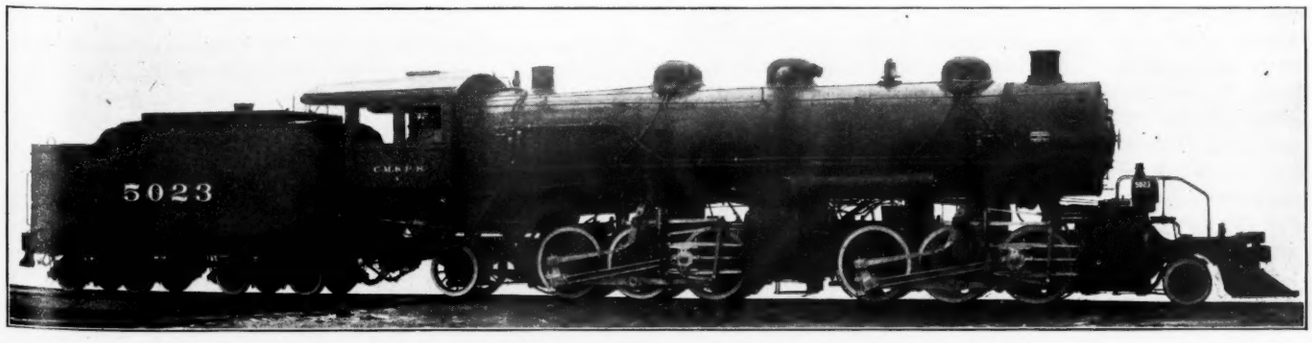
Boiler.

Style	Conical connection
Working pressure	200 lbs.
Outside diameter of first ring	83¾ in.
Firebox, width and length	96¼ in. x 108 1/16 in.
Firebox, plates, thickness	⅜ in.
Firebox, water space	5 in. and 4½ in.
Tubes, number and diameter	439—2¼ in.
Tubes, length	24 ft.
Heating surface, tubes	6,182 sq. ft.
Heating surface, firebox	346.5 sq. ft.
Heating surface, arch tubes	26.1 sq. ft.
Heating surface, total	6,554.6 sq. ft.
Grate area	72.3 sq. ft.
Center boiler, above rail	10 ft.
Top smokestack, above rail	15 ft. 5⅞ in.

Tender.

Tank, style	U shape
Frame	13 in. steel channels. 55 lb.
Wheels, diameter	33 in.
Journals	5½ in. x 10 in.
Water capacity	9,000 gals.
Coal capacity	14 tons

A concession is being sought from the Uruguayan government for an American company organized under the laws of Maine to construct a trans-Uruguayan railway to extend from Coronilla on the east coast, across Uruguay in a westerly direction to a port on the Uruguay river, there connecting with the railways of southern Brazil, northwestern Argentina and Paraguay. The concession also contemplates the construction of an extensive terminal port on the Atlantic coast. The present company has already completed all necessary preliminary surveys. This project, which has been periodically under consideration since 1888, is an extremely popular one in Uruguay. The name of the leading person connected with the new company may be obtained from the Bureau of Manufactures, Washington, D. C.



Mallet Locomotive; Chicago, Milwaukee & St. Paul.

BENJAMIN F. BUSH.

Benjamin Franklin Bush, president of the Western Maryland, was elected president of the Missouri Pacific, succeeding George J. Gould, at a meeting of the board of directors last Tuesday. His election was voted against by five of the twelve directors, these being: Paul M. Warburg and Cornelius Vanderbilt, representing the Kuhn, Loeb & Co. interests, F. T. Gates and E. L. Marston, representing the Rockefeller interests, and E. D. Adams, representing the Deutsche Bank interests. After the meeting, Messrs. Warburg and Vanderbilt resigned from the board. Mr. Gould made the following statement:

"The board has, I think, made a wise choice in selecting Mr. Bush as president. He is familiar with the conditions on the line, and with the affairs of the company gained while in its employ some years ago. I was much influenced in my advocacy of his election by the results he has attained in his administration of the Western Maryland property, and by the esteem in which I knew he was held by Mr. Rockefeller, who is so largely interested in the Western Maryland, and who, next to our family, is the largest stockholder in Missouri Pacific. Kuhn, Loeb & Co. have stated that in case of Mr. Bush's election to the presidency they would abandon their relations to the Missouri Pacific as bankers. My personal relations with the several members of the firm of Kuhn, Loeb & Co. have been so pleasant that I was reluctant to conclude that the continuance of that firm as bankers for the property was not to the corporation's best interests. I part with them with personal regret, but their interests in the Union and Southern Pacific, both essentially competitive lines to the Missouri Pacific, made a continuance of their relationship as bankers in my judgment inadvisable for the stockholders of the Missouri Pacific as well as for the public."

Benjamin F. Bush.

Kuhn, Loeb & Co., made a statement as follows: "A majority of the special committee, consisting of Messrs. Gates, Adams and Gould, appointed by the board immediately after the annual election in February last to consider and recommend a suitable president, did not favor Mr. Bush, who was the candidate of the Gould interests; but he was, nevertheless, elected to-day through the predominancy in the board of the Gould interests and against the votes of Messrs. Gates, Adams, Vanderbilt, Warburg and Marston. In consequence, Messrs. Warburg and Vanderbilt, deeming it impracticable to accomplish under prevailing conditions the objects which prompted them to enter the board and unwilling to share responsibility in the management of the compnay under these circumstances, have resigned as directors."

It is not believed that Kuhn, Loeb & Co. have sold any of their Missouri Pacific holdings. There have been rumors to that effect, but there is no reason to suppose that the bankers up to the time of the meeting, thought that the understanding between them and the Gould interests was not to be carried out.

The problems President Bush has to face are discussed in another column. He has the ability. He has built up the Western Maryland physically and has also developed its business. He has won the liking and respect of the people served by the Western Maryland, and he has made an organization which is running the road successfully. The qualities thus indicated are the qualities which a president of the Missouri Pacific needs. Also, Mr. Bush has been trained as a civil engineer and he is healthy.

He was born in Wellsburg, Pa., in 1860, and began railway work in 1882 as a rodman on the Northern Pacific. He worked in the engineering department until he was made a division engineer, and was then transferred to the company's coal properties. Here he did most efficient work, building up the properties and enlarging the output. After serving as chief engineer and general superintendent of the Oregon Improvement Co. and as general manager of the Northwestern Improvement Co., he became, in 1903, vice-president and general manager of the Western Coal & Mining Co. He was in charge of fuel purchases on the Missouri Pacific, and, in 1907, was made president of the Western Maryland. He was receiver of the property during its receivership.

FOREIGN RAILWAY NOTES

The southern terminus of the Tientsin-Pukow Railway, China, is at Pukow, just across the Yangtze Kiang river from Nanking, in Kiangsu province. A construction-train service was opened on January 20, 1911, which makes a daily run between Pukow and Linhwaikwan, 93 miles to the northwest, in about 12 hours. The rails are laid to Pengpu, 10 miles farther than Linhwaikwan, where the road crosses the Hwai river and where, according to the engineers, is located the largest task on the southern section, viz., the construction of the bridge. This work is being done by an American engineer, who is one of the three Americans thus employed on the southern section, and it is expected that this division will be ready for traffic by November, 1911, giving train service from Pukow to Hsuchowfu, in the northern part of Kiangsu.

The commission of the Russian Ministry of Communications has taken over and opened to traffic the newly built broad-gage railway from Herby on the German frontier to Kielce via Czenstochowa. The new line, which is 81 miles long, runs through a portion of the country rich in natural resources, which have as yet remained undeveloped owing to lack of proper communication. The line also forms a direct connection between the southern portions of Silesia and the interior of Russia, as at Kielce it joins the existing Dombrowa-Vistula railway, along which traffic can pass to the east without going through Warsaw or changing the gage except at Herby. Water-borne freight from Stettin via Kosel can thus be forwarded by a nearer direct route to the central and southern Russian provinces.

BLOCK SIGNAL MILEAGE JANUARY 1.

The Interstate Commerce Commission has issued its bulletin showing the mileage of railways in the United States worked by the block system on January 1, 1911. The principal table in this bulletin (table 1) is reproduced herewith; also table 2, showing the kinds of automatic block signals in use.

The total length of road in the United States operated under the block system on January 1, 1911, was 71,269.1 miles; 17,711.5 miles automatic, and 53,557.6 miles manual. There was an increase in 12 months of 3,473.8 miles automatic and 2,037.3 miles manual, making the increase in road operated under the block system during the year 5,511.1 miles.

Table 3, containing statistics of methods and apparatus used with the manual block system, shows a large increase in the mileage of road on which telephones are used in blocking. The Pennsylvania now reports more miles worked by telephone than by telegraph, and there are four prominent roads on which all of the manual blocking is done by telephone, namely: the Atchison, Topeka & Santa Fe; the Chicago, Rock Island & Pacific; the Chicago, Milwaukee & Puget Sound, and the Seaboard Air line. Other roads on which there are large increases in the telephone mileage are the Atlantic Coast Line, the Chicago & Northwestern, the Erie, the Evansville & Terre Haute, the Louisville & Nashville, and the Cleveland, Cincinnati, Chicago & St. Louis.

Table 4, containing statistics of different practices in use in the operation of the manual block system, shows that on a number of prominent roads the use of three-position signals for permissive blocking has largely increased; namely, on the Baltimore & Ohio Southwestern; the Chicago, Burlington & Quincy; the Chicago, Milwaukee & Puget Sound; the Louisville & Nashville, and the Nashville, Chattanooga & St. Louis.

The present bulletin includes the following roads which have not heretofore reported the use of the block system:

Beaumont, Sour Lake & Western (St. Louis & San Francisco); Central New England; Chesapeake & Ohio Railway of Indiana; Chicago, Rock Island & Gulf; Evansville & Terre Haute; Kentwood & Eastern; New Orleans & North Eastern (Queen & Crescent); New Orleans, Texas & Mexico (St. Louis & San Francisco); Orange & Northwestern (St. Louis & San Francisco); Quincy, Omaha & Kansas City and Iowa & St. Louis; Toledo, Peoria & Western; Toledo, St. Louis & Western; Western Pacific.

And the following electric or "interurban" lines which were not included in preceding bulletins:

Auburn & Northern; Illinois Traction; San Francisco, Oakland & San Jose Consolidated; Syracuse, Lake Shore & Northern; Tidewater Power Co.; Washington Water Power Co.

The Atlanta & West Point, the Davenport, Rock Island & Pacific, and the Mississippi Central do not appear, former reports having been erroneous. The Duluth, South Shore & Atlantic and the Western of Alabama have also dropped out. The Chicago, Burlington & Quincy and the Chicago, Milwaukee & St. Paul operate jointly 12.4 miles of double track, covered by automatic signals. Each company owns and has signaled one track; this installation is shown as double track for each company. The Northern Pacific and the Great Northern operate jointly 60.3 miles of double track covered by automatic signals. Each company owns one track, and the signals are owned and maintained by the Northern Pacific. This is operated as double track and is shown as such in these tables for each company. The Illinois Central and the St. Louis & San Francisco operate jointly 35 miles of single track covered by automatic signals. In these tables this mileage is credited to both companies.

Comparing the present report with the report for January 1, 1910, the following notable changes appear, the figures in each case representing miles of road:

Name of railroad.	Increase. Automatic. *Miles.*	Increase. Non-automatic. *Miles.*	Decrease, non-automatic. *Miles.*
Baltimore & Ohio	28.8	43.2	.....
Boston & Maine	153.7	.....	.....
Chesapeake & Ohio	134.9	.....	.....
Chicago Great Western	117.8	1,039.9	.....
Chicago, Rock Island & Pacific	*333.4	.....	154.1
Cincinnati, Indianapolis & Western	.....	57.2	.....
Delaware, Lackawanna & Western	52.5	.....	.....
Great Northern	60.6	.....	.....
Hocking Valley	.....	69.3	.....
Illinois Central	36.5	.....	.....
Long Island	21.2	.....	.....
Louisville & Nashville	11.0	279.6	.....
Maine Central	153.0	.....	.....
Minneapolis, St. Paul & Sault Ste. Marie	.....	265.5	.....
Missouri Pacific: St. Louis, Iron Mtn. & Southern	29.5	.....	.....
New York Central Lines:			
Cleveland, Cincinnati, Chicago & St. Louis	.....	57.1	.....
Peoria & Eastern	.....	81.2	.....
Northern Pacific	179.0	.....	396.7
Pennsylvania:			
Grand Rapids & Indiana	.....	55.8	.....
Pennsylvania Co.	103.6	170.5	.....
Philadelphia, Baltimore & Washington	.....	47.8	.....
Pittsburg, Cincinnati, Chicago & St. Louis	.....	32.6	.....
Vandalia	.....	124.0	.....
St. Louis & San Francisco	428.8	.....	122.4
Southern Pacific, Atlantic System	63.8	.....	.....
Southern Pacific, Pacific System	279.9	.....	.....
Union Pacific	116.2	.....	.....
Oregon Short Line	203.0	.....	.....

Alternating Current.—The use of alternating current track circuits in connection with signal installations is reported by the Auburn & Northern; Cumberland Valley; Hudson & Manhattan; Syracuse, Lake Shore & Northern; Long Island; New York, New Haven & Hartford; Northwestern Pacific; Pennsylvania; Philadelphia, Baltimore & Washington; West Jersey & Seashore; San Francisco, Oakland & San Jose Consolidated, Washington Terminal and Washington Water Power Company. All of these installations are on lines equipped for electric traction except the Cumberland Valley, the Washington Terminal and a small part of the Pennsylvania.

Automatic train stops are used on the Erie, the Hudson & Manhattan, the New York City Terminal of the Pennsylvania, and the suburban lines of the Washington Water Power Company. On the Erie the Harrington automatic stop is used on 11.8 miles of one track of double-track road. On the Hudson & Manhattan automatic stops are used in connection with all signals. In the Pennsylvania Terminal in New York automatic stops are used in connection with signals throughout the tunnels, covering 4.4 miles of road, or 13.7 miles of track. The Washington Water Power Company uses automatic stops in connection with automatic signals on 29 miles of track.

The Train Staff.—The Delaware, Lackawanna & Western and the Tide Water Power Company (Wilmington, N. C.) operate a few miles of road by means of the train staff without electric control. So far as known, these are the only two installations of this form of block system. The installation on the Lackawanna is on a section of road which is used only for freight trains. On the Tide Water Power Company's line the staff system is regularly used every day from May 1 to September 20, and on Sunday afternoon only from September 20 to May 1.

Trolley Electric Lines.—The bulletin this year for the first time gives statistics of certain interurban electric railways, on which space-interval regulations are in force, but the list is not complete, as many companies of this character do no interstate business. The mileage given under this head is not added to that given in the other tables.

The interurban lines are nearly all single-track roads. Usually the cars make frequent stops, more frequent than is customary on steam railways, and in many cases the electric lines have to deal with a fluctuating traffic. For these and other reasons they provide freely in their regulations for the presence of two or more trains, running in the same direction, in one block section at the same time; that is to say, where any block system is in use it is generally permissive block signaling. One train (usually a single car) follows another under rules requiring motormen at meeting points to give to one another by word of mouth the necessary information concerning the number of trains run-

TABLE 1.—RAILWAYS WORKED BY BLOCK SYSTEM JANUARY 1, 1911.—(SEE NOTES ON NEXT PAGE.)

Names of railroads.	Automatic block signals.						Nonautomatic block signals.						Total automatic and nonautomatic.		Total passenger lines operated.		Percentage block-signaled (miles of track).
	Single track.	Double track.	Three track.	Four track.	Total. Miles of road.	Total. Miles of track.	Single track.	Double track.	Three track.	Four track.	Total. Miles of road.	Total. Miles of track.	Miles of road.	Miles of track.	Miles of road.	Miles of track.	
Ann Arbor							1.4				1.4	1.4	1.4	1.4	291.9	291.9	0.4
Atchison, Topeka & Santa Fe:																	
Eastern lines	5.7	73.6			79.3	152.9	361.4	475.3	12.9		849.6	1,350.7	928.9	1,503.6	2,519.0	3,097.1	48.5
Western lines	33.4	2.4			35.8	38.2	541.8	23.9			565.7	589.6	601.5	627.8	2,797.8	2,824.1	22.2
Coast lines	18.9	1.0			19.9	20.9	4.3				4.3	4.3	24.2	25.2	1,825.5	1,872.3	1.3
Gulf, Colorado & Santa Fe	10.8				10.8	10.8	2.1				2.1	2.1	12.9	12.9	1,540.0	1,540.0	.8
Atlantic Coast Line	3.1	12.1			15.2	27.3	373.1	101.7			474.8	576.5	490.0	603.8	3,832.4	3,957.9	15.1
Auburn & Northern	6.5				6.5	6.5							6.5	6.5	6.5	6.5	100.0
Baltimore & Ohio	15.2	198.3		4.6	218.1	430.1	363.6	580.4	87.0	15.7	1,046.7	1,847.9	1,264.8	2,278.0	3,140.5	4,205.1	54.2
Baltimore & Ohio Chicago Terminal	.8	10.0			10.8	20.8							10.8	20.8	45.8	73.0	28.5
Baltimore & Ohio Southwestern		14.0			14.0	28.0	922.8	35.0		2.2	960.0	1,001.9	974.0	1,029.9	980.1	1,039.7	99.0
Baltimore & Sparrow's Point							1.7	3.0			4.7	7.7	4.7	7.7	4.7	7.7	100.0
Bessemer & Lake Erie							64.4	130.3			194.7	325.1	194.7	325.1	191.8	322.2	96.9
Boston & Maine	124.7	570.3		2.1	697.1	1,273.7		4.8			4.8	9.6	701.9	1,283.3	2,238.6	2,801.6	45.8
Boston, Revere Beach & Lynn		13.8			13.8	27.6							13.8	27.6	13.8	27.6	100.0
Buffalo, Rochester & Pittsburg							301.2	128.7			429.9	558.7	429.9	558.7	429.9	558.7	100.0
Butte, Anaconda & Pacific	7.9				7.9	7.9							7.9	7.9	25.3	25.3	31.2
Central New England							16.0				16.0	16.0	16.0	16.0	275.0	296.9	5.7
Central of Georgia							52.3	7.4			59.7	67.1	59.7	67.1	1,915.9	1,915.9	3.5
Central of New Jersey	13.0	165.5	2.4	31.5	212.4	477.2							212.4	477.2	464.1	742.9	64.2
Chesapeake & Ohio		183.0			183.0	366.0	1,274.2	125.9			1,400.1	1,526.0	1,583.1	1,892.0	1,607.4	1,916.3	98.7
Chesapeake & Ohio Ry. of Indiana							269.0				269.0	269.0	269.0	269.0	269.0	269.0	100.0
Chicago & Alton	416.1	144.9			561.0	705.9	141.2				141.2	141.2	702.2	847.1	998.9	1,143.0	74.1
Chicago & Eastern Illinois		98.4			95.4	196.8	173.9	57.5			231.4	288.9	329.8	485.7	693.0	849.5	57.2
Chicago & North Western		719.6	13.8	6.0	739.4	1,504.6	2,409.3	115.3			2,524.6	2,639.9	3,264.0	4,144.5	6,894.0	7,806.0	53.1
Chicago & Western Indiana		17.8			17.8	35.6		6.3	3.2		9.5	22.2	27.3	57.8	27.3	57.8	100.0
Chicago, Burlington & Quincy		35.4	1.6	5.4	42.4	97.2	8,070.8	602.7	17.1	1.4	8,692.0	9,333.1	8,734.8	9,430.3	8,421.5	9,171.2	100.0
Chicago Great Western	61.0	64.9			125.9	190.8	1,307.2	23.7			1,330.9	1,354.6	1,456.4	1,545.4	1,472.2	1,568.4	98.5
Chicago, Indianapolis & Louisville							525.0				525.0	525.0	525.0	525.0	579.1	579.1	90.6
Chicago, Milwaukee & St. Paul	5.9	103.7			109.6	213.3	3,368.2	438.8			3,807.0	4,245.8	3,916.6	4,459.1	7,511.6	8,081.5	55.2
Chicago, Milwaukee & Puget Sound							1,364.7				1,364.7	1,364.7	1,364.7	1,364.7	1,364.7	1,364.7	100.0
Chicago, Peoria & St. Louis Ry. of Illinois	1.3				1.3	1.3							1.3	1.3	226.9	226.9	.6
Chicago, Rook Island & Pacific	653.3	279.6			932.9	1,212.5	997.7				997.7	997.7	1,930.6	2,210.2	6,682.7	6,974.4	31.6
Chicago, Rock Island & Gulf	32.6				32.6	32.6							32.6	32.6	468.9	468.9	6.9
Chicago, St. Paul, Minneapolis & Omaha		6.2			6.2	12.4	591.9	64.1			656.0	720.1	662.2	732.4	1,468.1	1,553.4	47.2
Cincinnati, Hamilton & Dayton	20.0	14.3			34.3	48.6	20.0	13.9			33.9	47.8	68.2	96.4	527.9	563.4	17.1
Cincinnati, Indianapolis & Western							99.0				99.0	99.0	99.0	99.0	360.9	360.9	27.2
Colorado Midland							2.0				2.0	2.0	2.0	2.0	258.4	258.4	.8
Cornwall & Lebanon							8.3	13.7			22.0	35.7	22.0	35.7	22.0	35.7	100.0
Cumberland & Pennsylvania							4.3		3.0		7.3	13.3	7.3	13.3	31.3	34.8	38.2
Cumberland Valley		6.7			6.7	13.4	19.6				19.6	19.6	26.3	33.0	162.2	207.0	15.9
Delaware & Hudson	163.1	225.1	4.3	17.5	410.0	696.3							410.0	696.3	743.9	1,042.4	55.1
Delaware, Lackawanna & Western	104.7	435.1	38.3	6.6	584.7	1,116.3	5.8				5.8	5.8	590.5	1,122.1	922.1	1,465.9	76.5
Duluth & Iron Range							14.8	1.4			16.2	17.6	16.2	17.6	168.0	240.0	7.3
Durham & Southern							56.0				56.0	56.0	56.0	56.0	56.0	56.0	100.0
Elgin, Joliet & Eastern	2.0	3.0			5.0	8.0	11.3				11.3	11.3	16.3	19.3	223.9	281.6	6.8
Erie		212.2		14.9	227.1	484.0	643.5	432.3			1,075.8	1,508.1	1,302.9	1,992.1	1,706.5	2,395.7	83.1
Chicago & Erie							240.4	8.4			248.8	257.2	248.8	257.2	248.8	257.2	100.0
Columbus & Erie							12.6	9.8			22.4	32.2	22.4	32.2	22.4	32.2	100.0
Erie & Jersey		42.3			42.3	84.6							42.3	84.6	Freight line.		
New Jersey & New York		10.5			10.5	21.0	26.1				26.1	26.1	36.6	47.1	51.8	61.3	76.6
New York, Susquehanna & Western							16.0	18.7			34.7	53.4	34.7	53.4	208.4	227.1	23.5
Evansville & Terre Haute							105.8				105.8	105.8	105.8	105.8	143.3	143.3	73.8
Grand Trunk	1.1	1.6			2.7	4.3							2.7	4.3	686.6	1,014.9	.4
Great Northern	8.5	122.3			130.8	253.1	258.5				258.5	258.5	389.3	511.6	7,020.4	7,142.7	7.2
Hocking Valley							144.0				144.0	144.0	144.0	144.0	336.6	375.5	38.3
Hudson & Manhattan		7.3			7.3	15.6							7.3	15.6	7.3	15.6	100.0
Illinois Central	65.1	235.1		12.0	312.2	620.9	9.0	5.0			14.0	19.0	326.2	639.9	4,462.7	5,027.2	12.7
Yazoo & Mississippi Valley	6.6				6.6	6.6							6.6	6.6	1,193.0	1,200.7	.6
Illinois Traction							24.0				24.0	24.0	24.0	24.0	415.0	415.0	5.7
Iowa Central							11.0				11.0	11.0	11.0	11.0	503.0	503.0	2.2
Kanawha & Michigan	.8				.8	.8	1.3				1.3	1.3	2.1	2.1	162.9	162.9	1.3
Kansas City, Clinton & Springfield							2.5				2.5	2.5	2.5	2.5	156.7	156.7	1.6
Kentucky & Indiana Bridge & R. R. Co.							4.8	5.8	.5		11.1	17.9	11.1	17.9	11.1	17.9	100.0
Kentwood & Eastern							3.3				3.3	3.3	3.3	3.3	30.0	30.0	11.0
Lackawanna & Wyoming Valley							1.0	2.4			3.4	5.8	3.4	5.8	22.6	43.4	13.3
Lehigh & New England	.7				.7	.7							.7	.7	67.2	67.2	
Lehigh Valley	14.1	439.3	34.6	13.0	501.0	1,048.6	652.0	62.3			714.3	776.7	1,215.3	1,825.3	1,171.5	1,741.3	100.0
Long Island	4.0	96.8	3.3	8.8	112.9	242.7		22.7			22.7	45.4	135.6	288.1	391.9	549.5	52.4
Louisville & Nashville	40.9	22.3			63.2	85.5	392.3	103.6			495.9	599.5	559.1	685.0	4,372.0	4,543.0	15.1
Maine Central	415.1	57.7			472.8	530.5							472.8	530.8	907.6	967.2	54.8
Marquette & Southeastern							3.7				3.7	3.7	3.7	3.7	50.8	50.8	7.3
Minneapolis, St. Paul & Sault Ste. Marie							2,446.8	4.4			2,451.2	2,455.6	2,451.2	2,455.6	3,423.4	3,427.8	71.6
Missouri, Kansas & Texas	5.9				5.9	5.9	8.6				8.6	8.6	14.5	14.5	3,072.0	3,072.0	.2
Missouri Pacific	55.2	25.7			80.9	106.0	11.6	7.0			18.6	25.6	99.5	131.6	3,708.4	3,767.0	2.5
St. Louis, Iron Mountain & Southern	113.8	8.6			122.4	131.0	11.1	1.6			12.7	14.3	135.1	145.3	3,178.5	3,318.8	4.4
Mobile & Ohio		4.7			4.7	9.4	47.8				47.8	47.8	52.5	57.2	825.0	825.0	6.9
Monongahela	.5				.5	.5							.5	.5	66.7	66.7	.7
Nashville, Chattanooga & St. Louis							92.8	11.8			104.6	116.4	104.6	116.4	1,230.1	1,241.9	9.3
Newburgh & South Shore							1.0	5.2			6.2	11.4	6.2	11.4	Freight line.		
New York & Long Branch		38.0			38.0	76.0							38.0	76.0	38.0	76.0	100.0
New York Central lines:																	
Boston & Albany		132.9	50.1	23.6	206.6	510.6		1.9			1.9	3.7	208.5	514.3	351.6	602.0	85.4
Chicago, Indiana & Southern		5.0			5.0	10.0	143.8	59.9			203.7	263.6	208.7	273.6	309.4	374.3	73.1
Cleveland, Cincinnati, Chicago & St. Louis							562.7	361.8			924.5	1,286.8	924.5	1,286.8	1,832.9	2,214.7	59.9
Lake Erie & Western							862.9	9.0			871.9	880.9	871.9	880.9	832.5	841.5	100.0
Lake Shore & Michigan Southern	6.9	173.2	98.4	240.3	518.8	1,609.7	996.0	48.3	11.8		1,056.1	1,128.0	1,574.9	2,737.7	1,452.7	2,596.6	100.0
Dunkirk, Allegheny Valley & Pittsburg							90.5				90.5	90.5	90.5	90.5	90.5	90.5	100.0
Lake Erie, Alliance & Wheeling							87.7				87.7	87.7	87.7	87.7	87.7	87.7	100.0
Michigan Central		271.9			271.9	543.9	901.0	19.3			920.3	939.6	1,192.2	1,483.5	1,192.2	1,483.5	100.0
New York Central & Hudson River	2.0	262.4	6.3	110.8	381.5	988.7	1,632.0	688.5	15.4	138.8	2,474.7	3,610.4	2,856.2	4,599.1	2,873.7	4,674.5	98.4
Peoria & Eastern							84.0	2.5			86.5	89.0	86.5	89.0	337.9	340.4	26.1
Pittsburg & Lake Erie		101.8		47.0	148.8	391.6	19.8	2.9			22.7	25.6	171.5	417.2	183.9	420.4	99.2
New York, New Haven & Hartford	17.5	245.0		9.2	271.7	562.7	154.3	205.7		75.8	435.8	868.9	707.5	1,431.6	1,926.4	2,967.1	47.7
New York, Ontario & Western	36.0	111.6			147.6	259.2							147.6	259.2	492.8	626.2	41.4
Norfolk & Western	68.0	272.8			340.8	613.6	1,245.3	66.1			1,311.4	1,377.5	1,652.2	1,991.1	1,671.6	2,025.5	97.1
Northern Pacific	101.5	136.7			238.2	374.9	708.0	285.5			993.5	1,279.0	1,231.7	1,653.9	5,303.4	5,752.6	28.7
Northwestern Pacific	2.5	11.4			13.9	25.4	250.5				250.5	250.5	264.4	275.9	330.6	342.0	80.7
Pennsylvania		58.0	4.9	200.0	262.9	934.2	1,428.2	708.3	25.8	199.2	2,361.5	3,769.0	2,624.4	4,703.2	3,261.0	5,479.5	85.8
Cleveland, Akron & Columbus							126.5	17.4			143.9	161.3	143.9	161.3	177.8	195.8	82.4
Cincinnati & Muskingum Valley							11.4				11.4	11.4	11.4	11.4	148.4	148.4	7.7
Grand Rapids & Indiana							55.8	2.2			58.0	60.2	58.0	60.2	536.7	547.3	11.0
Northern Central							287.1	120.1		20.5	427.7	609.3	427.7	609.3	439.7	635.9	95.7
Pennsylvania Company		273.7	23.3	47.3	344.3	806.5	418.9	325.0	5.2		749.1	1,084.5	1,093.4	1,891.0	1,315.0	2,125.6	89.0
Philadelphia, Baltimore & Washington		18.2		21.0	39.2	121.7	154.5	147.0	17.1	15.3	333.9	561.0	373.1	682.7	639.4	945.5	72.2
Pittsburg, Cincinnati, Chicago & St. Louis		7.8		3.4	11.2	29.2	507.2	515.4	58.9	20.6	1,102.1	1,797.1	1,113.3	1,826.3	1,415.3	2,140.7	85.3
West Jersey & Seashore		87.1	6.3		93.4	193.1	47.1	33.0			80.1	113.1	173.5	306.2	318.2	455.6	67.2
Vandalia							300.9	61.0			361.9	422.8	361.9	422.8	797.0	868.1	48.9

RAILWAYS WORKED BY THE BLOCK SYSTEM—(TABLE 1 CONTINUED.)

Names of railroads.	Automatic block signals.						Nonautomatic block signals.						Total automatic and nonautomatic.		Total passenger lines operated.		Percentage block-signaled (miles of track).
	Single track.	Double track.	Three track.	Four track.	Total. Miles of road.	Total. Miles of track.	Single track.	Double track.	Three track.	Four track.	Total. Miles of road.	Total. Miles of track.	Miles of road.	Miles of track.	Miles of road.	Miles of track.	
Peoria & Pekin Union								6.0			6.0	12.0	6.0	12.0	15.4	26.6	48.8
Pere Marquette	15.2				15.2	15.2	39.0				39.0	39.0	54.2	54.2	1,534.2	1,541.4	3.5
Philadelphia & Reading	6.2	324.0	42.1	14.0	386.3	836.5	143.6	96.9			240.5	337.4	626.8	1,173.9	875.3	1,452.3	80.8
Atlantic City		86.9			86.9	173.8	35.7				35.7	35.7	122.6	209.5	163.6	251.6	83.3
Northeast Pennsylvania	2.8	1.8			4.6	6.4	1.6				1.6	1.6	6.2	8.0	25.5	27.3	29.3
Perkiomen							38.1				38.1	38.1	38.1	38.1	38.1	38.1	100.0
Philadelphia, Newton & New York	3.8	1.8	1.5		7.1	11.9							7.1	11.9	21.7	26.6	44.7
Reading & Columbia							35.9				35.9	35.9	35.9	35.9	53.3	53.3	67.4
Quincy, Omaha & Kansas City and Iowa & St. Louis							305.0				305.0	305.0	305.0	305.0	305.0	305.0	100.0
Queen & Crescent Route:																	
Alabama Great Southern	91.7	.4			92.1	92.5							92.1	92.5	290.6	295.4	31.7
Cincinnati, New Orleans & Texas Pacific	264.9	69.2			334.1	403.4	.7				.7	.7	334.8	404.1	335.4	404.6	99.8
New Orleans & Northeastern		15.5			15.5	31.0							15.5	31.0	15.5	31.0	14.7
Richmond, Fredericksburg & Potomac							9.0	78.7			87.7	166.4	87.7	166.4	87.7	166.4	100.0
St. Joseph & Grand Island							.3				.3	.3	.3	.3	251.6	251.6	
St. Louis & San Francisco	562.3	37.8			600.1	637.9	157.3				157.3	157.3	757.4	795.2	4,726.6	4,764.4	16.7
Beaumont, Sour Lake & Western							84.7				84.7	84.7	84.7	84.7	117.0	117.0	72.3
New Orleans, Texas & Mexico							157.6				157.6	157.6	157.6	157.6	265.6	265.6	60.5
Orange & Northwestern							61.6				61.6	61.6	61.6	61.6	61.6	61.6	100.0
St. Louis Merchants Bridge Terminal		5.9			5.9	11.8		1.1			1.1	2.2	7.0	14.0	10.0	19.8	77.7
St. Louis Southwestern	.4				.4	.4							.4	.4	622.7	622.7	
San Francisco, Oakland & San Jose Consolidated		3.9			3.9	7.8							3.9	7.8	15.7	27.7	28.5
San Pedro, Los Angeles & Salt Lake	1.1				1.1	1.1							1.1	1.1	904.4	904.4	.1
Seaboard Air Line							213.5				213.5	213.5	213.5	213.5	2,782.9	2,782.9	7.6
Southern		3.0			3.0	6.0	1,588.3	247.3			1,835.6	2,082.9	1,838.6	2,088.9	6,619.6	6,898.6	30.3
Southern Illinois & Missouri Bridge		4.6			4.6	9.2							4.6	9.2	4.6	9.2	100.0
Southern Pacific, Atlantic System:																	
Galveston, Harrisburg & San Antonio	279.1				279.1	279.1							279.1	279.1	1,270.5	1,275.0	21.9
Louisiana Western	103.6				103.6	103.6							103.6	103.6	140.3	140.3	73.9
Morgan's Louisiana & Texas	95.3				95.3	95.3							95.3	95.3	241.9	282.1	33.8
Texas & New Orleans	109.8				109.8	109.8							109.8	109.8	438.4	441.8	24.9
Southern Pacific: Pacific System	2,189.2	164.9		1.0	2,355.1	2,523.0	98.0				98.0	98.0	2,453.1	2,621.0	6,447.7	6,671.4	39.3
Staten Island Rapid Transit		10.9			10.9	21.7							10.9	21.7	10.1	20.1	96.5
Staten Island							2.5	10.2			12.7	22.8	12.7	22.8	12.7	22.8	100.0
Spokane, Portland & Seattle								10.0			10.0	20.0	10.0	20.0	422.0	432.0	4.6
Syracuse, Lake Shore & Northern		6.5			6.5	13.0							6.5	13.0	33.0	44.5	27.6
Terminal R. R. Association of St. Louis		6.0			6.0	12.0		1.1			1.1	2.2	7.1	14.2	12.7	25.5	55.7
Tidewater Power Co.							6.2				6.2	6.2	6.2	6.2	11.3	15.7	39.5
Toledo, Peoria & Western							.3				.3	.3	.3	.3	220.0	220.0	.1
Toledo, St. Louis & Western							188.0				188.0	188.0	188.0	188.0	451.0	451.0	41.7
Ulster & Delaware	24.4				24.4	24.4							24.4	24.4	126.3	126.3	19.8
Union		.6			.6	1.2	1.4				1.4	1.4	2.0	2.6	7.4	14.8	17.6
Union Pacific	871.0	551.0		1.7	1,423.7	1,979.1	11.4				11.4	11.4	1,435.1	1,990.5	3,467.3	4,088.2	48.7
Oregon R. R. & Navigation Co.	433.0				433.0	433.0							433.0	433.0	1,140.9	1,140.9	37.0
Oregon Short Line	551.5	25.7			577.2	602.9							577.2	602.9	1,442.4	1,468.1	41.0
Virginia & Kentucky							.6				.6	.6	.6	.6	4.8	4.8	12.5
Virginian							2.2				2.2	2.2	2.2	2.2	435.6	435.6	.5
Wabash		7.2			7.2	14.4	1,726.7	94.0			1,820.7	1,914.7	1,827.9	1,929.1	1,954.9	2,056.1	93.8
Wabash Pittsburg Terminal		4.1			4.1	8.2							4.1	8.2	59.8	63.9	12.8
Washington Southern								32.2			32.2	64.4	32.2	64.4	32.2	64.4	100.0
Washington Terminal		1.1		1.0	2.1	20.4							2.1	20.4	2.1	20.4	100.0
Washington Water Power Co.	29.0				29.0	29.0							29.0	29.0	29.0	29.0	100.0
Western Pacific	11.2				11.2	11.2							11.2	11.2	921.6	921.6	1.2
Total	8,312.2	8,225.4	331.2	842.7	17,711.5	29,202.4	44,897.1	7,913.1	257.9	489.5	53,557.6	63,505.5	71,269.1	92,707.9	172,389.9	195,922.4	

NOTE.—On the Atchison, Topeka & Santa Fe there is a length of 81 miles, in manual block signalled territory, on which there are short sections of automatic signals. On the Bessemer & Lake Erie there is a length of nine miles on which no passenger trains are run. On the Hudson & Manhattan the signals are light signals, not shown in Table 2. The column headed "Four-track" includes short sections of road having more than four tracks on the following lines: Illinois Central; New York, New Haven & Hartford; Pennsylvania; Washington Terminal.

ning on a single schedule. The electric track circuit is used very little on these roads. Most of their signal installations operate in the following manner: When a train enters a block section the action at that end is made to produce an effect at the other end, as a protection against opposing cars, by means of an electric current flowing through line wires on poles. This operation is concontrolled at the entering end either by the motorman, who stops his car and moves a hand switch fixed in a box on a pole, or automatically by a circuit-closing device arranged on the overhead trolley wire which extends along the track, which device is so designed as to produce the necessary impulse on the block-signal wire whenever it is touched by the trolley wheel of a passing car. Signal indications are given by incandescent electric lights, often of two or more colors, shown in boxes on the poles. To provide against the failure of the trolley contact to perform its function properly, it is required that the motorman observe the behavior of the signal light as the trolley contact is passed, and if the contact does not produce the desired effect, to back his car and cause the operation to be repeated.

To facilitate permissive block signaling on single-track lines for following cars, while at the same time retaining absolute block rules as regards cars running in opposite directions, some of the systems have "counting-in" apparatus which is designed to insure that the signal against opposing trains shall not be cleared until as many cars have passed out of the block section as passed in. This counting-in apparatus, however, does not seem to have secured general approval among the officers of the roads which have used it.

For the reasons here suggested the mileage is not included with that showing the use of the block system as the term "block system" is usually understood. Two important features of the system as used on the steam roads are not found on the roads under consideration, namely (1) control of the signal at the entrance of each block section by a signalman constantly in attendance or, in the case of automatic signals, by the train which occupies the block section, this train control being effected through a track circuit continuous through the block section; and (2) the prohibition of permissive block signaling under all ordinary circumstances except between trains which carry no passengers.

Those interurban lines which have automatic block signals of the ordinary type are included in Tables 1 and 2, as above noted.

TELEGRAPH AND TELEPHONE FOR TRAIN ORDERS.

The bulletin contains the usual table, showing the extent to which the telephone has been adopted for use in transmitting train orders. This table is much longer than last year, because there are now included those electric railways which report to the commission. Including these, there are now 55 companies (8 of them electric roads) which have 100 miles or more of their

TABLE 2.—KINDS OF AUTOMATIC SIGNALS IN USE.

Names of railroads.	Exposed disk.		Inclosed disk.		Semaphores.						Normal clear. (miles of track).	Normal danger (miles of track).	Total automatic signals.		
					Electropneumatic.		Electric motor.		Electro-gas.						
	Miles of road.	Miles of track.	Miles of road.	Miles of track.	Miles of road.	Miles of track.	Miles of road.	Miles of track.	Miles of road.	Miles of track.			Miles of road.	Miles of track.	Number of block sections.
Atchison, Topeka & Santa Fe:															
Eastern lines			13.3	26.6			66.0	126.3			152.9		79.3	152.9	92
Western lines							35.8	38.2			38.2		35.8	38.2	36
Coast lines			5.4	5.4			14.5	15.5			20.9		19.9	20.9	19
Gulf, Colorado & Santa Fe			8.3	8.3			2.5	2.5			10.8		10.8	10.8	8
Atlantic Coast Line							15.2	28.3			28.3		15.2	28.3	35
Auburn & Northern							6.5	6.5			6.5		6.5	6.5	3
Baltimore & Ohio			9.9	9.9	7.5	22.4	107.1	211.6	93.6	186.2		430.1	218.1	430.1	502
Baltimore & Ohio Chicago Terminal			1.0	2.0			9.8	18.8			20.8		10.8	20.8	32
Baltimore & Ohio Southwestern							14.0	28.0				28.0	14.0	28.0	35
Boston & Maine			.8	1.6			687.4	1,254.3	8.9	17.8	1,254.3	19.4	697.1	1,273.7	1,615
Boston, Revere Beach & Lynn							13.8	27.6			27.6		13.8	27.6	59
Butte, Anaconda & Pacific			7.9	7.9							7.9		7.9	7.9	7
Central of New Jersey					29.7	116.0	163.3	323.2	19.4	38.0	439.2	38.0	212.4	477.2	734
Chesapeake & Ohio							183.0	366.0			366.0		183.0	366.0	262
Chicago & Alton							561.0	705.9			183.0	522.9	561.0	705.9	368
Chicago & Eastern Illinois[1]			8.7	13.8			98.4	196.8			210.6		107.1	210.6	165
Chicago & North Western			736.5	1,498.8	2.9	5.8					1,504.6		739.4	1,504.6	1,162
Chicago & Western Indiana							17.8	35.6			35.6		17.8	35.6	59
Chicago, Burlington & Quincy			23.0	46.0	2.0	8.0	17.4	43.2			97.2		42.4	97.2	38
Chicago Great Western							125.9	190.8			190.8		125.9	190.8	182
Chicago, Milwaukee & St. Paul			2.4	2.4			103.7	207.4	3.5	3.5	197.4	15.9	109.6	213.3	203
Chicago, Peoria & St. Louis Ry. of Ill.							1.3	1.3			1.3		1.3	1.3	1
Chicago, Rock Island & Pacific			6.0	12.0			926.9	1,200.5			1,209.5	3.0	932.9	1,212.5	1,252
Chicago, Rock Island & Gulf							32.6	32.6			32.6		32.6	32.6	50
Chicago, St. Paul, Minneapolis & Omaha							6.2	12.4			12.4		6.2	12.4	6
Cincinnati, Hamilton & Dayton							34.3	48.6			48.6		34.3	48.6	78
Cumberland Valley							6.7	13.4			13.4		6.7	13.4	13
Delaware & Hudson			38.4	76.8					371.6	619.5		696.3	410.0	696.3	1,013
Delaware, Lackawanna & Western			26.6	51.2			558.1	1,065.1			1,116.3		584.7	1,116.3	1,558
Elgin, Joliet & Eastern							5.0	8.0			8.0		5.0	8.0	5
Erie							227.1	484.0			5.2	478.8	227.1	484.0	579
Erie & Jersey							42.3	84.6			84.6		42.3	84.6	88
New Jersey & New York							10.5	21.0				21.0	10.5	21.0	22
Grand Trunk					2.7	4.3					4.3		2.7	4.3	3
Great Northern							130.8	253.1			251.1	2.0	130.8	253.1	219
Illinois Central			29.5	104.2			118.8	186.9	163.9	329.8	254.6	366.3	312.2	620.9	535
Yazoo & Mississippi Valley							6.6	6.6			6.6		6.6	6.6	8
Kanawha & Michigan							.8	.8			.8		.8	.8	1
Lehigh & New England							.7	.7			.7		.7	.7	1
Lehigh Valley			251.2	534.6			233.8	482.0	16.0	32.0		1,048.6	501.0	1,048.6	1,068
Long Island							112.9	242.7			238.7	4.0	112.9	242.7	386
Louisville & Nashville							63.2	85.5			85.5		63.2	85.5	132
Maine Central							472.8	530.5			530.5		472.8	530.5	542
Missouri, Kansas & Texas			.5	.5			5.4	5.4			5.9		5.9	5.9	8
Missouri Pacific							80.9	106.0			106.0		80.9	106.0	90
St. Louis, Iron Mountain & Southern							122.4	131.0			131.0		122.4	131.0	122
Mobile & Ohio							4.7	9.4			9.4		4.7	9.4	3
Monongahela							.5	.5			.5		.5	.5	1
New York & Long Branch							38.0	76.0			76.0		38.0	76.0	118
New York Central Lines:															
Boston & Albany[2]	16.2	33.3					182.5	447.7	7.2	14.4	154.9	350.5	205.9	495.4	634
Chicago, Indiana & Southern							5.0	10.0			10.0		5.0	10.0	19
Lake Shore & Michigan Southern			5.3	5.3			336.4	928.9	177.1	675.5	934.2	675.5	518.8	1,609.7	1,611
Michigan Central[3]			67.5	134.9			193.8	387.6			522.5		261.3	522.5	359
New York Central & Hudson River[4]			9.9	19.7			416.0	944.7	8.1	16.2	695.4	285.2	379.4	980.6	1,282
Pittsburg & Lake Erie							148.8	391.6			391.6		148.8	391.6	207
New York, New Haven & Hartford	177.1	338.3	64.7	129.4			29.9	95.0			562.7		271.7	562.7	591
New York, Ontario & Western	65.6	100.9					82.0	158.3			259.2		147.6	259.2	150
Norfolk & Western					.7	.7	340.1	612.9			612.9	.7	340.8	613.6	594
Northern Pacific			1.5	1.5			236.2	372.4	.5	1.0	374.9		238.2	374.9	401
Northwestern Pacific							13.9	25.4			25.4		13.9	25.4	42
Pennsylvania[5]			5.0	10.0	242.3	874.8	10.6	21.2			906.0		257.9	906.0	1,556
Pennsylvania Co.							344.3	806.5			806.5		344.3	806.5	1,082
Philadelphia, Baltimore & Washington					39.2	121.7					121.7		39.2	121.7	150
Pittsburg, Cincinnati, Chicago & St. Louis							11.2	29.2			29.2		11.2	29.2	70
West Jersey & Seashore					93.4	193.1					193.1		93.4	193.1	249
Pere Marquette			10.0	10.0			5.2	5.2			15.2		15.2	15.2	11
Philadelphia & Reading[6]			386.6	837.3	1.0	2.0			14.0	20.1	2.0	857.4	401.6	859.4	993
Atlantic City			86.9	173.8								173.8	86.9	173.8	93
Northeast Pennsylvania			4.6	6.4								6.4	4.6	6.4	8
Philadelphia, Newtown & New York			7.1	11.9								11.9	7.1	11.9	16
Queen & Crescent Route:															
Alabama Great Southern	29.0	29.0	9.0	9.0			54.1	54.5			92.5		92.1	92.5	62
Cincinnati, New Orleans & Texas Pacific	35.3	35.3	56.6	56.6			240.2	309.5	2.0	2.0	374.6	28.8	334.1	403.4	326
New Orleans & Northeastern							15.5	31.0			31.0		15.5	31.0	16
St. Louis & San Francisco			3.9	7.8			596.2	630.1			630.1	7.8	600.1	637.9	353
St. Louis Merchants' Bridge Terminal							5.9	11.8			11.8		5.9	11.8	30
St. Louis Southwestern							.4	.4			.4		.4	.4	1
San Francisco, Oakland & San Jose Consolidated							3.9	7.8			7.8		3.9	7.8	76
San Pedro, Los Angeles & Salt Lake			1.1	1.1							1.1		1.1	1.1	1
Southern							3.0	6.0			6.0		3.0	6.0	9
Southern Illinois & Missouri Bridge							4.6	9.2			9.2		4.6	9.2	18
Southern Pacific—Atlantic System:															
Galveston, Harrisburg & San Antonio							279.1	279.1			279.1		279.1	279.1	204
Louisiana Western							103.6	103.6			103.6		103.6	103.6	73
Morgan's Louisiana & Texas							95.3	95.3			95.3		95.3	95.3	72
Texas & New Orleans							109.8	109.8			109.8		109.8	109.8	77
Southern Pacific—Pacific System			1.0	1.0	6.0	14.0	2,348.1	2,508.0			2,523.0		2,355.1	2,523.0	2,177
Staten Island Rapid Transit			10.9	21.7							21.7		10.9	21.7	50
Syracuse, Lake Shore & Northern							6.5	13.0			13.0		6.5	13.0	26
Terminal R. R. Association of St. Louis							6.0	12.0			12.0		6.0	12.0	16
Ulster & Delaware							24.4	24.4			24.4		24.4	24.4	20
Union			.6	1.2							1.2		.6	1.2	2
Union Pacific			8.9	15.1			1,381.5	1,902.1	33.3	61.9	1,979.1		1,423.7	1,979.1	1,585
Oregon R. R. & Navigation Co.							433.0	433.0			433.0		433.0	433.0	308
Oregon Short Line			10.4	10.4			566.8	592.5			602.9		577.2	602.9	463
Wabash							7.2	14.4			14.4		7.2	14.4	25
Wabash Pittsburg Terminal					4.1	8.2					8.2		4.1	8.2	11
Washington Terminal					2.1	20.4						20.4	2.1	20.4	13
Washington Water Power Co.							29.0	29.0			29.0		29.0	29.0	23
Western Pacific							11.2	11.2			11.2		11.2	11.2	8
Total	323.2	536.8	1,920.9	3,866.1	433.6	1,391.4	14,167.6	21,339.4	919.1	2,017.9	23,058.9	6,092.7	17,709.8	29,151.6	29,881

[1] (Chicago & Eastern Illinois.) The figures in this table include 8.7 miles of inclosed disk signals used in manual block territory which are not shown in Table 1.
[2] (Boston & Albany.) 1.7 miles of road, 5.2 miles of track protected by slotted signals not shown in this table.
[3] (Michigan Central.) 10.6 miles semiautomatic and slotted signals not shown in this table.
[4] (New York Central & Hudson River.) 2 miles 4-track, light signals, not shown in this table. The apparent discrepancy in road mileage in this table is due to the fact that different types of signals are used on the different tracks of 4-track sections of road.
[5] (Pennsylvania.) 5 miles of road, 28.2 miles of track protected by light signals not shown in this table.
[6] (Philadelphia & Reading.) Includes 15.3 miles of road used exclusively for freight trains not shown in Table 1.

lines equipped for telephone operation. Last year there were only 32 companies thus equipped, though the electric lines were not then included.

The commission's last preceding bulletin was noticed in the *Railway Age Gazette* of June 3 and 17, 1910.

JUDGE SANBORN ON STATE INTERFERENCE WITH INTERSTATE COMMERCE AND VALUATION OF RAILWAYS.

The two principal questions passed on by Judge Walter H. Sanborn of the United States Circuit Court for the District of Minnesota, in his opinion (rendered on April 11) in the Minnesota rate case were: When does state regulation become an unconstitutional interference with interstate commerce? and What are the correct bases of valuation of railways and a "fair return" on such valuation? We published last week (page 921) the syllabus of Judge Sanborn's opinion. The two principal questions passed on by him are in themselves of such interest and importance, and his discussion of them and holdings in regard to them of such interest and importance, because of the new precedents they establish, that we will give abstracts (in the court's own language) of the discussions and rulings regarding these matters. Below is the court's remarks on state interference, next week we will give an abstract of the discussion on valuation.

STATE INTERFERENCE WITH INTERSTATE COMMERCE.

The first question for consideration is whether or not the orders of the commission and the acts of the legislature substantially burden interstate commerce, and the answer to this question must be drawn from an application of the facts which disclose their effect to the rules of law which govern this subject.

The power to regulate commerce among the states was carved out of the general sovereign power by the people when the national government was formed, and granted by the constitution to the congress of the nation. That grant is exclusive. The United States may exercise that power to its utmost extent, may use all means requisite to its complete exercise, and no state, by virtue of any power it possesses, either under the name of the police power or under any other name, may lawfully restrict or infringe this grant, or the plenary exercise of this power; for these are paramount to all the powers of the state and inhere in the supreme law of the land. The fares and rates of transportation of passengers and freight in interstate commerce are national in their character and susceptible of regulation by uniform rules. The silence or inaction of congress relative to such a subject is a conclusive indication that it intends that the interstate commerce therein shall be free, so far as the congress has not directly regulated it.

If the plenary power of the nation to protect the freedom of and to regulate interstate commerce and the attempted exercise by a state of its power to regulate intrastate commerce, or the attempted exercise of any of its other powers, impinge or conflict, the former must prevail and the latter must give way, because the constitution and the acts of Congress in pursuance thereof are the supreme law of the land, and "that which is not supreme must yield to that which is supreme."

Subject to the constitutional limitation, which has been stated, a state may enact and enforce laws prescribing reasonable fares and rates for and otherwise regulating its intrastate commerce, although the operation of such laws remotely or incidentally affects interstate commerce.

On the other hand, the laws of a state or the orders of its commissions relating to its intrastate commerce which by their necessary or natural or probable operation have the effect substantially to burden interstate commerce are beyond its powers, violative of the commercial clause of the constitution, and void.

The acts of the legislature of Minnesota and the orders of its commission are so general and so far reaching in their effect that there is no doubt that they unavoidably affect the interstate commerce of the companies. In the light of the rules and decisions reviewed, the question here at issue therefore becomes: Do these statutes and orders substantially burden or only incidentally or remotely affect the interstate commerce of the companies? This question, however, may not be answered by the words or terms of the laws and orders, or by a consideration of the intent or purpose of their makers alone. The touchstone to the true answer to the question and the test of the validity of the orders and statutes is their effect upon interstate commerce.

The counter proposition again presented in this case, that it is only where orders and statutes by their terms or by their construction by state courts substantially or directly regulate interstate commerce, or where by their terms they disclose an intent of their makers so to do that they may be adjudged violative of the commercial clause, has been repeatedly urged upon the consideration of the Supreme Court, only to be conclusively denied.

Only last year in the Kansas cases (216 U. S., 1, 56) the Supreme Court again repudiated this contention. In those cases a statute of Kansas required of foreign corporations certain fees as a condition of permitting them to conduct intrastate business in that state. The Western Union Telegraph Company, which was carrying on both intrastate and interstate business in Kansas, applied for permission to continue its intrastate business, and the charter board of the state ordered that its application be granted only on condition that it pay the fee prescribed by the statute, and "that nothing herein contained shall apply to nor be construed as restricting in any wise the transaction by the said applicant of its interstate business, nor its business for the federal government, but that this grant of authority and requirement as to payment relates only to the business transacted wholly within the state of Kansas." The officers of the state insisted that this statute and this order were valid because by their express terms they excluded interstate business, applied to intrastate business alone, and disclosed a clear purpose and intent of the legislature and the board not to obstruct or embarrass interstate commerce in any way. But the Supreme Court reviewed several of its earlier decisions upon this subject, held the statute and the order unconstitutional, and, among other things, said:

"But the disavowal by the state of any purpose to burden interstate commerce cannot conclude the question as to the fact of such a burden being imposed, or as to the unconstitutionality of the statute as shown by its necessary operation upon interstate commerce. If the statute, reasonably interpreted, either directly or by its necessary operation burdens interstate commerce, it must be adjudged to be invalid, whatever may have been the purpose for which it was enacted, and although the company may do both interstate and local business. This court has repeatedly adjudged that in all such matters the judiciary will not regard mere forms, but will look through forms to the substance of things." (216 U. S., 1, 27.)

Here, then, is the decisive question upon this branch of these cases. Is the effect of the statutes and orders assailed substantially to burden the interstate commerce of the companies? And we turn to the facts of this case for the answer.

Counsel for the defendants insist that this question should be answered in the negative.

They say that, while the reduction of the local fares and rates may induce the companies to reduce their interstate rates and fares across the borders of the state to a parity with the local rates, this is the voluntary act of the companies not directly required by the laws and orders. There are, however, known and inexorable laws of commerce, and one of them is that transported articles will move at the lowest available rates. Reduce local fares and rates so that fares and rates in interstate commerce across the borders of the state are substantially higher than the sums of the locals over the Minnesota stations on or

near the state boundaries, and the companies must reduce their interstate fares and rates on that portion of their interstate commerce affected by the sums of the locals over the Minnesota borders to a substantial parity with the sums of the locals, or their interstate commerce affected thereby will unavoidably become intrastate commerce, and move at the sums of the locals. There is nothing voluntary on the part of the companies in the loss or burden imposed upon them by these reductions. That they must suffer whether they reduce their interstate rates or maintain them and permit the transformation of their affected interstate commerce into intrastate commerce by rebilling and local contracts so that it can pass at the sums of the locals. The loss of the difference in revenue between that derived from their former interstate rates and that derived from the sums of the locals is a direct and unavoidable burden upon their interstate commerce imposed by the acts and orders stated which the companies may not by any device avoid.

Moreover, the acts and orders making these intrastate reductions necessarily operate to discriminate against interstate commerce and the right of the companies to carry it on, and in that way constitute a direct burden upon such commerce.

Another vicious and inevitable effect of these acts and orders is the unjust discrimination in fares and rates between localities in Minnesota and those beyond its borders which they affect. Moorhead, Minn., and Fargo, N. D., are practically the same distance from St. Paul, Minneapolis and Duluth, respectively. They have long received, and they ought to continue to receive, the same fares and rates in and out. This is also true of Duluth, Minn., and Superior, Wis.; Breckenridge, Minn., and Wahpeton, N. D.; East Grand Forks, Minn., and Grand Forks, N. D. These acts and orders reduced the fares to and from the Minnesota towns of these pairs from and to other Minnesota points 33 1-3 per cent., and the freight rates from 7 per cent. to 25 per cent., while the former interstate fares and rates from and to the other towns of the pairs remained in effect, as to commodity rates under the protection of the injunction of this court, and would have continued in effect in the matter of merchandise rates and the passenger fares, had not the prohibition of discriminations between localities by the interstate commerce law and the laws of trade which have been considered compelled the companies to reduce their interstate rates to a parity with the local rates prescribed. The discrimination thus wrought by these acts and orders between the towns mentioned on the state lines is but illustrative of the undue preference and advantage the local reductions gave to Minnesota cities and towns, and the unreasonable prejudice and disadvantage to which they subjected the towns and the cities of other states similarly situated in their vicinity.

Congress, by the "act to regulate commerce" (24 Stat., 379), forbade the companies to make or give any undue or unreasonable preference or advantage to any party or locality, or to subject any party or locality to any unreasonable prejudice or disadvantage in any respect whatsoever, and the prevention of the discrimination thus prohibited was one of the main purposes of this legislation. The first section of the act, however, contained this provision:

"Provided, however, that the provisions of this act shall not apply to transportation of passengers or property, or to the receiving, storage or handling of property wholly within one state, and not shipped to or from a foreign country from or to any state or territory aforesaid."

The result was that the act of Congress forbade, and the acts and orders of the officers of Minnesota compelled, this discrimination between localities under the penalty of the surrender by the companies of a substantial part of their interstate commerce or of the revenue therefrom. Counsel for the defendants argue, however, that this radical discrimination is not forbidden by the interstate commerce law because it is a discrimination wrought, not by an undue difference between intrastate rates of which they say the state has exclusive jurisdiction, nor by an undue difference between interstate rates of which they admit the nation has exclusive jurisdiction, but by an undue difference between intrastate rates and interstate rates, and they contend that over the discrimination thus wrought neither state nor nation has any power. The argument, however, again disregards the broad and fundamental difference between the power of the state over intrastate commerce and the power of the nation over interstate commerce. The state may regulate its intrastate commerce so far only as the exercise of its power does not substantially burden or regulate or discriminate against interstate commerce, but no farther. A state may not prohibit or regulate discrimination between interstate and intrastate rates in such a way as substantially to burden or regulate interstate commerce, as, for instance, by the prohibition of a higher charge or rate for a short haul wholly within the state than for a long haul that includes the short haul and extends into another state, because such action burdens and regulates interstate commerce. By the same mark, because it is a direct regulation of interstate commerce, the nation may regulate and prohibit discriminations wrought by an undue difference between interstate and intrastate rates, although such regulation or prohibition may also to some extent affect and regulate intrastate commerce. For to the extent necessary completely and effectually to regulate interstate commerce the nation by the Congress and its courts may affect and regulate intrastate commerce.

"This power," said Chief Justice Marshall, "like all others vested in Congress, is complete in itself, may be exercised to its utmost extent, and acknowledges no limitations, other than are prescribed in the constitution. . . . If, as has always been understood, the sovereignty of Congress, though limited to specified objects, is plenary as to those objects, the power over commerce with foreign nations, and among the several states, is vested in Congress as absolutely as it would be in a single government having in its constitution the same restrictions on the exercise of the power as are found in the Constitution of the United States." The power therefore to prohibit the railway companies from making or permitting any undue discrimination between localities and parties by unreasonable differences between intrastate and interstate rates was vested in Congress, and no acts or orders of the state or its officers could justify such a discrimination.

But counsel insist that, if Congress had the power to forbid this discrimination, it did not exercise it because it declared in the proviso to section 1 that the provisions of the interstate commerce act should not apply to transportation wholly within one state. But the main object of the act was to prevent every undue discrimination between parties and between localities. When it was enacted there was a crying evil in such discriminations, an insistent public demand for the remedy thereof, and a determined effort by the legislators to make the prohibitions of such discriminations as broad, searching and effective as the Congress had the power to make them. It had, as we have seen, ample authority to forbid discriminations wrought by differences between intrastate and interstate rates, but none to prohibit discriminations caused by differences in rates for transportations wholly within a state. The act prohibits any undue discrimination in any respect whatever between localities under similar circumstances and conditions by any common carrier subject to its provisions. In the light of these facts the natural and reasonable construction of the proviso in section 1 is that it was inserted out of abundance of caution to make sure that the broad terms of the act did not go beyond the constitutional power of the Congress and directly regulate intrastate commerce more than was necessary completely to regulate interstate commerce, and that it has no farther effect upon the subject of discrimination now under discussion. The evil the act was passed to remedy, the main purposes of its passage, the public demand for a prevention of all discriminations, the patent effort of the legislators to meet this demand, and the broad terms of the prohibitions themselves compel the conclusion that the Congress

intended to exercise, and that by this act it did exercise, its constitutional power to prevent discriminations of the character here in question to its utmost extent, and that the companies were and are prohibited thereby from making or maintaining the unjust discriminations between localities which the maintenance of their former lawful interstate fares and rates and the intrastate rates prescribed by the acts and orders of the officers of the state would necessarily effect."

Finally, counsel cite, to overcome the proof of the substantial burden and the direct regulation of interstate commerce affected by the acts and orders in this case, with which this record teems, these words from the opinion of Mr. Justice Brewer in Ames v. Union Pacific (C. C.), 64 Fed. 172:

"Neither can I understand how the reduction of local rates, as a matter of law, interferes with interstate rates. It is true that the companies may, for their own convenience, to secure business, or for any other reason, rearrange their interstate rates and make them conform to the local rates prescribed by the statute; but surely there is no legal compulsion. The statute of the state does not work a change in interstate rates, any more than an act of congress prescribing interstate rates would legally work a change in local rates. Railways cannot plead their own convenience, or the effect of competition between themselves and other companies, in restraint of the otherwise undeniable power of the state."

The reduction of local rates does not interfere with interstate rates, "as a matter of law," yet it may do so as a matter of fact. Whether or not the general and sweeping reductions in local rates in Minnesota necessarily interfere with interstate rates and interstate commerce is in this case, as it must be in every case, a question of fact. The facts which determine that question in this case have been set forth in this opinion at great length, because it is upon them, and not upon legal inferences, that the answer to the question, whether or not the effect of the necessary operation of the acts and orders challenged is substantially to burden interstate commerce, now rests. Those facts are that it was not for "their own convenience," but at great inconvenience and loss, not on account of the "effect of competition between themselves and other companies," but because these acts and orders, the prohibition of discrimination between localities by the interstate commerce act and the laws of trade forced them to do so, that the defendants reduced their interstate commerce rates to a parity with the local rates and submitted to the loss of interstate revenue this action entailed. The opinion of Mr. Justice Brewer in the Ames case is inapplicable to the cases in hand, because no such array of condemnatory facts was ever submitted to him in that case, and it is perhaps not too much to say that no case has been found in the books in which any such proof of the unavoidable effect of general reductions of intrastate rates to substantially burden and directly regulate interstate commerce has ever been presented.

If, in the early proceedings in the Northern Pacific case, the Supreme Court was moved to say of the issue whether the necessary effect of these acts and orders was to interfere with and to regulate interstate commerce, "the question is not, at any rate, frivolous," how, now, that their necessary effect upon that commerce has been indisputably proved to be not only general and substantial, but controlling and compelling, may they escape the ban of the constitution? If one state might by such radical reductions of its local fares and rates below legal interstate fares and rates constitutionally use the laws of trade and the prohibition of discriminations in the interstate commerce law to force like reductions of interstate rates, all states might do so, and the power of the states to regulate fares and rates in interstate commerce would be supreme and that of Congress and the Interstate Commerce Commission inferior and futile. Such does not seem to be the law.

The section from Yuto to Pichanal of the Ledesma to Embarcacion Railway, Argentina, has been opened to public service.

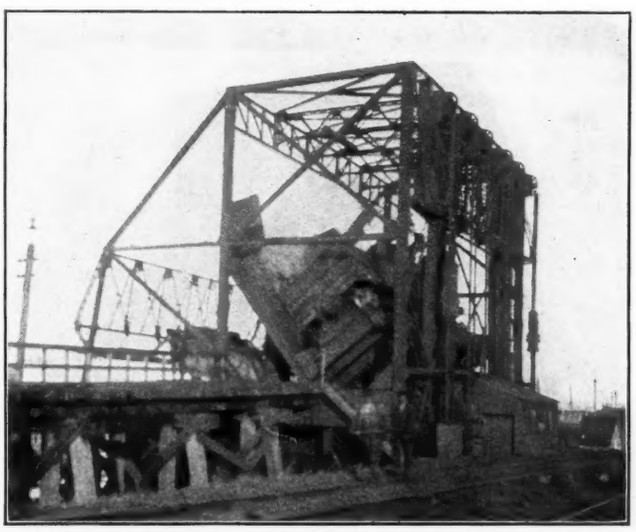
SEWALL'S POINT TERMINAL; VIRGINIAN RAILWAY.

The terminal of the Virginian Railway, at Sewall's Point, Va., is of interest, both from the standpoint of the engineering features which it embodies, and the fact that it is an attempt to utilize on the seaboard the facilities for the rapid handling of bulk freight that have been used so successfully on the great lakes. In a previous article (*Railway Age Gazette,* March 31, 1911), the reasons for the adoption of this system are set forth. They were based on the necessity of handling large

Standard Gondola.

quantities of coal with rapidity and economy, and these led to the adoption of the car unloader and the special conveyor car with a gravity system of moving the loads and empties about the yard.

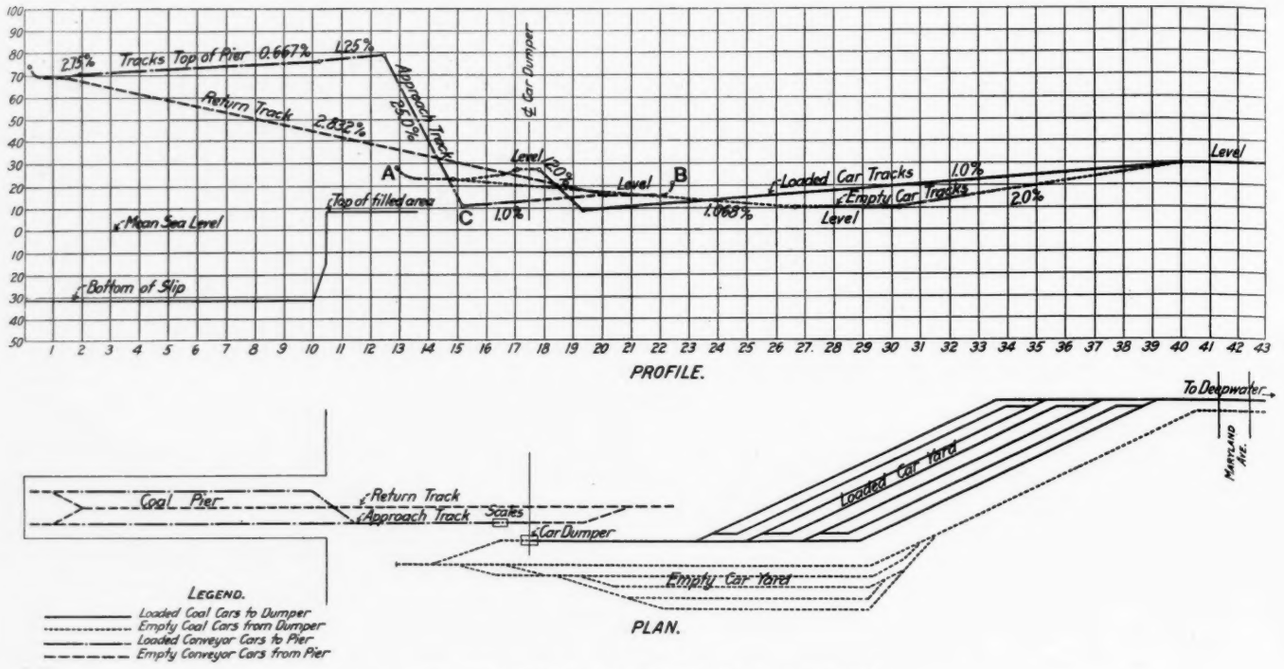
As in other matters pertaining to the construction of the road, the engineers were blessed with a free hand and a fair field, unencumbered with previous constructions and unhampered by the necessity of utilizing or modifying existing facilities in the construction of the terminal. The site selected was well removed from the city, improvements being about six miles to the north of the business centre of the city of Norfolk, Va.,



Car Unloader; Virginian Railway.

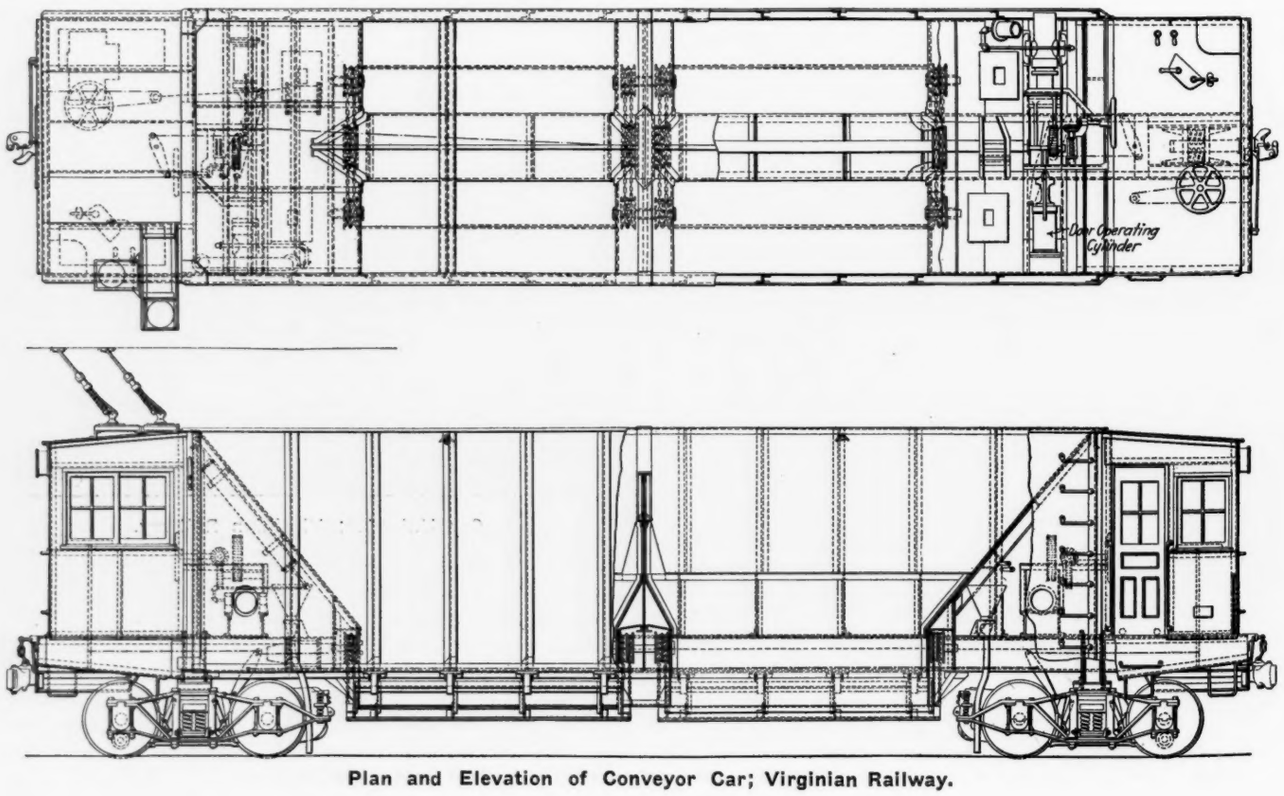
on Hampton Roads. When the property was acquired several years ago, it was an open plain near the site of the Jamestown Exposition, but not occupied by any of its buildings. It is reached by the line making a wide detour around and to the east of the city, so that, even in the approach, there is no interference because of an encroachment on the lines of existing traffic. Then, in addition to the freedom, there was ample space for the work to be done.

The terminal property may be divided into two parts. The



Plan and Profile of Sewall's Point Terminal.

receiving and classification yard, and the terminal yard and wharf. The former serves as a receiving and storing yard for the cars as they are received from the mines. It will be borne in mind that there is but little pooling of the output of the mines on the Virginian Railway, and that each selling agent ships to seaboard for loading into vessels ordered alongside the wharf for his own product. Hence, there comes to be an accumulation of cars in the receiving yard that must be held back until a vessel is ready to receive their contents. Then, when the vessel is ready, they are ordered delivered to the barney or loaded car yard, which lies inland to the east of the wharf and which is built on a 1.0 per cent. grade. The tracks from this yard lead out to a ladder track, still holding the same grade that runs down to within about 153 ft. of the car dumper. From this point to the latter there is a stiff rise on a 12 per cent. incline to the car dumper, up which they are pushed by a barney car. Each car has a rider who releases the brakes in the yard, controls the speed to the foot of the grade and sets the brakes so as to spot the car in the proper position on the dumper. The track of the latter is level, and when it has returned to the release or receiving position with the empty car, this car stands there until it is bumped off by the one following. As it is struck it runs out down the incline to the switchback at A and thence through an automatic switch, down a 1.068 per

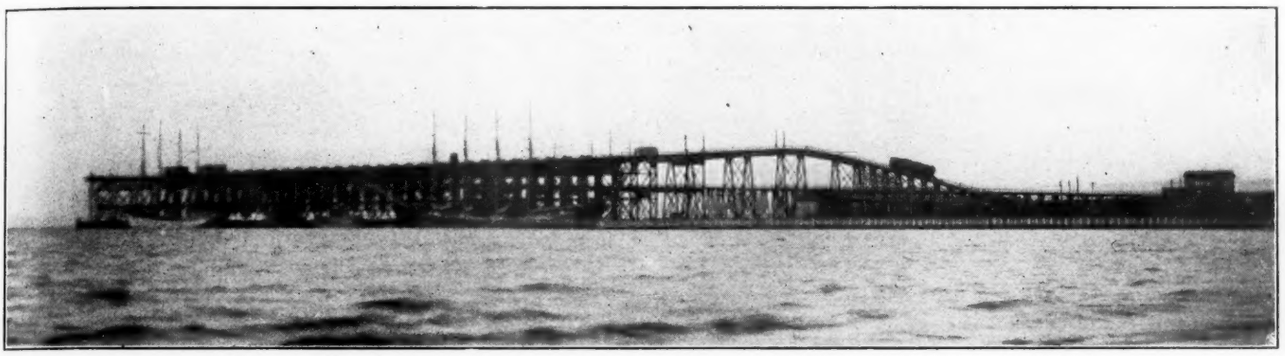


Plan and Elevation of Conveyor Car; Virginian Railway.

cent. grade to the empty car yard, whence they are handled by locomotives up a 2 per cent. grade to the main line level and westbound track. This is the cycle for the regular road gondolas.

It will be seen from the diagram that the car dumper is well in shore from the wharf and the foot of the incline leading to it. It delivers into a specially constructed conveyor car, driven by electric motors. It is of 60-tons capacity, is of the hopper-bottom type and has a cabin at each end for the operator.

to furnish current to the cars so that if they overrun the chute into which they are to be dumped, they can be run back and accurately spotted. Emptied, they run out to the switchback at the end of the pier and drop down the return track at the center to the switchback at B, from which they started. The whole work of handling the cars at the terminal is, thus, a gravity system supplemented by two barneys for pushing the cars up the inclines and by the motors on the conveyor cars to insure the accurate spotting of them.



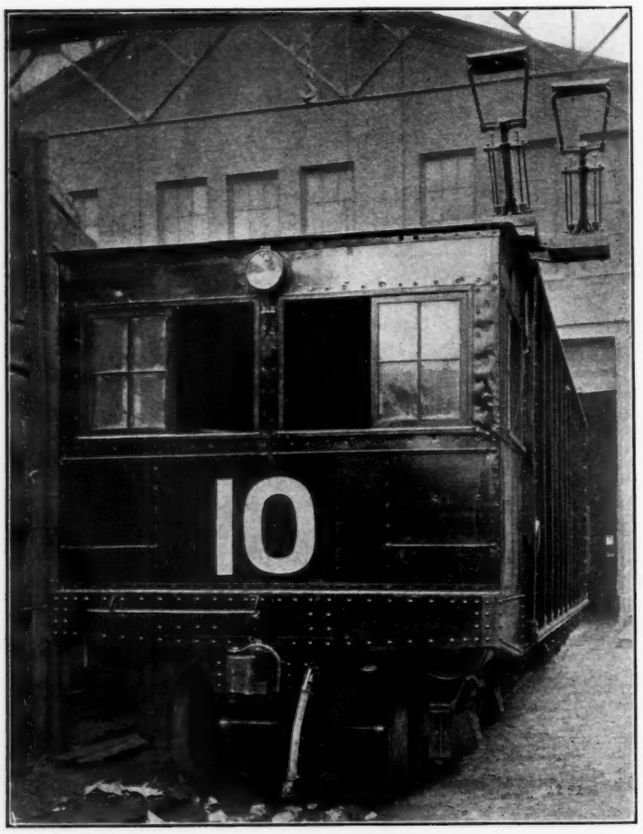
General View of Terminal.

This car is dropped down the 1.0 per cent. incline from the switchback at B, and stopped opposite the car dumper. After receiving the load they are run on down to the foot of the incline at C, where they are picked up by a barney and pushed to the top of the 25 per cent. incline at the shore end of the wharf. The tracks on the latter drop down to the outer end, starting on a 1.25 per cent. grade, and ending on one of 0.667 per cent. These tracks are also equipped with an overhead wire

The wharf itself is a steel structure carried on towers standing on concrete piers resting on long piles. The concrete piers are protected by an independent timber pier built as a fender about them so as to ward off the blows of vessels alongside. The floor of this fender pier is 10 ft. above mean low-water level, and 1.6 ft. above the maximum high water of the spring tides The steel work of the superstructure is of steel bents set on 50 ft. centers, and so braced as to form alternate towers and

Conveyor Car; Virginian Railway.

bays. The girders are designed to carry the tracks for the conveyor cars, which weigh 200,000 lbs., loaded. The pockets, of which there are 22, are so constructed that they have a vertical range of 33 ft. and a side range of 25 ft., so that vessels can be tied up at any point, and loaded or coaled, regardless of the location of their hatches. The capacity of each of the pockets is 60 tons, and they are of such strength that a full load can be dumped into them at once without overstraining the metal. This large capacity, besides making it possible to unload the



End View of Conveyor Car; Virginian Railway.

conveyor cars at once, serves as a storage from which coal can be gradually discharged while the vessel below is being trimmed, while the vertical adjustment enables the loading to be done with very little breakage.

The wharf is about 2,000 ft. long, from the shore to the outer end. The steel portion of the structure has a length of 1,045 ft., a width of 65 ft., and is 76 ft. high at the shore end, and 69 ft. at the outer end. The approach is over a steel and timber incline, located on filled ground, between temporary bulkheads which are 860 ft. long, the permanent bulkhead at the front being 500 ft. long.

The original slope of the shore was that of a smooth gravelly beach into shallow water. The bottom has been dredged, so that there is a clear depth of 30 ft. at low water for 180 ft. on either side of the wharf and for 2,500 ft. out to the main channel.

As previously stated, the terminal has a continuous working capacity of a car every two minutes, or 1,500 tons per hour.

The gondola cars that are used on the road were especially designed for the service, one of the features of which is the use of a stiffening angle along the top edge to prevent a buckling or crimping of the plates in the unloading machine. The car was illustrated in the *Railway Age Gazette* of June 12, 1908. The stiffening angle which had not been worked out in detail at that time is shown here. The design has been a success, and despite the apparent roughness of the handling, the top edges of the sides are still as straight as when they left the manufacturer.

The conveyor cars were designed and built by the Wellman-Seaver-Morgan Co., Cleveland, O., in accordance with the requirements of the railway company. There are ten of these cars, each of 60 tons capacity, and each equipped with electric motors, air brakes and pneumatic door openers, supplied with air by a compressor on the car. A cab is built at each end for the operator, though he does not change his position with the reversal of the motion of the car. The current is taken from an overhead wire, and Westinghouse motors are used. The cars dump readily and clear themselves perfectly.

It will be seen from the drawing that the slope of the hopper, at the ends, is much steeper than that ordinarily used in a hopper-bottom car. The whole bottom drops between the lower ends of these inclines. This insures the rapid action that is necessary. In other respects, such as the tracks, draft gear and so forth, the cars follow the general details of ordinary car construction.

The terminal has now been in service for a little more than a year, and is meeting all of the requirements for which it was designed.

MALLET LOCOMOTIVES BUILT AND UNDER CONSTRUCTION.

The accompanying table gives the number and sizes of Mallet locomotives built by the American Locomotive Company and the Baldwin Locomotive Works, up to the middle of March of this year. While it does not represent all the Mallet locomotives built in this country, it represents at least 96 per cent. of them. The total number shown in this table is 539. Their total weights amount to 185,500,000 lbs., and their total hauling capacity is very nearly 36,000,000 lbs. Assuming an average train resistance of 5 lbs. per ton, these locomotives would haul a train of 144,000 freight cars, weighing 50 tons each, loaded.

MALLET ARTICULATED COMPOUND LOCOMOTIVES BUILT AND UNDER CONSTRUCTION.

Road.	No.	Type.	Cylinders.	Diameter Drivers, inches.	Boiler Pressure, lbs.	Tractive Effort, lbs.	Total Weight, lbs.	Weight on Drivers, lbs.	Gage of Track.
Alabama Great Southern	1	2-6-8-0	23 & 35 x 32	56	200	72,700	363,550	332,700	4 ft. 8½ in.
American R. R. of Porto Rico	4	0-6-6-0	12½ & 19 x 20	37	200	20,300	106,650	106,650	3 ft. 3⅜ in.
Atchison, Topeka & Santa Fe	2	4-4-6-2	24 & 38 x 28	73	200	53,000	376,450	268,000	4 ft. 8½ in.
Atchison, Topeka & Santa Fe	2	2-8-8-2	26 & 38 x 34	63	220	96,000	462,450	412,350	4 ft. 8½ in.
Atchison, Topeka & Santa Fe	2	2-6-6-2	24 & 38 x 28	69	220	61,500	392,300	317,300	4 ft. 8½ in.
Atchison, Topeka & Santa Fe	28	2-6-6-2	24 & 38 x 28	69	220	61,500	365,900	295,500	4 ft. 8½ in.
Atchison, Topeka & Santa Fe	10	2-6-6-2	24 & 38 x 28	69	220	61,500	370,200	304,300	4 ft. 8½ in.
Baltimore & Ohio	1	0-6-6-0	20 & 32 x 32	56	235	71,500	335,000	335,000	4 ft. 8½ in.
Baltimore & Ohio	5	0-8-8-0	26 & 41 x 32	56	210	105,000	454,000	454,000	4 ft. 8½ in.
Baltimore & Ohio	5	0-8-8-0	26 & 41 x 32	56	210	105,000	454,000	454,000	4 ft. 8½ in.
Binghamton & Garfield	2	0-8-8-0	26 & 41 x 28	51	220	107,000	450,000	450,000	4 ft. 8½ in.
Booth-Kelly Lumber Company	1	2-6-6-2	17 & 26 x 24	44	200	37,800	205,950	177,200	4 ft. 8½ in.
Boston & Albany	1	2-6-6-2	20½ & 33 x 32	57	210	66,600	343,000	296,500	4 ft. 8½ in.

MALLET ARTICULATED COMPOUND LOCOMOTIVES BUILT AND UNDER CONSTRUCTION.

Road.	No.	Type.	Cylinders.	Diameter Drivers, inches.	Boiler Pressure, lbs.	Tractive Effort, lbs.	Total Weight, lbs.	Weight on Drivers, lbs.	Gage of Track.
Boston & Maine	4	2-6-6-2	22 & 35 x 30	61	200	62,700	308,000	262,000	4 ft. 8½ in.
Carolina, Clinchfield & Ohio	1	2-6-6-2	23 & 35 x 32	57	200	71,000	342,650	299,250	4 ft. 8½ in.
Carolina, Clinchfield & Ohio	10	2-6-6-2	24 & 37 x 32	57	200	77,500	378,650	325,850	4 ft. 8½ in.
Caspar Lumber Co.	1	2-6-6-2	13 & 19 x 20	37	200	21,900	124,050	105,000	4 ft. 8½ in.
Central R. R. of Brazil	10	0-8-8-0	20 & 32 x 26	50½	200	54,600	265,000	265,000	5 ft. 3 in.
Central R. R. of Brazil	3	0-6-6-0	18 & 28 x 26	60½	200	40,000	208,000	208,000	5 ft. 3 in.
Central R. R. of Brazil	3	0-6-6-0	17½ & 28 x 26	50	200	42,400	206,000	206,000	5 ft. 3 in.
Central South African	9	2-6-6-2	18 & 28½ x 26	46	200	47,700	230,000	196,000	3 ft. 6 in.
Central South African	1	2-6-6-2	18 & 28½ x 26	46	210	48,100	225,000	192,500	3 ft. 6 in.
Chapman Timber Co.	1	2-6-6-2	18½ & 28 x 28	51	200	48,600	235,300	204,500	4 ft. 8½ in.
Chesapeake & Ohio	1	2-6-6-2	22 & 35 x 32	56	225	82,000	392,000	324,000	4 ft. 8½ in.
Chesapeake & Ohio	24	2-6-6-2	22 & 35 x 32	56	225	82,000	392,000	324,000	4 ft. 8½ in.
Chicago & Alton	3	2-6-6-2	22 & 35 x 30	62	220	61,650	327,000	286,300	4 ft. 8½ in.
Chicago, Burlington & Quincy	3	2-6-6-2	21½ & 33 x 32	55	200	64,500	362,150	321,450	4 ft. 8½ in.
Chicago, Burlington & Quincy	5	2-6-6-2	21½ & 33 x 32	56	200	63,300	361,450	327,200	4 ft. 8½ in.
Chicago, Burlington & Quincy	10	2-6-6-2	23 & 35 x 32	64	200	63,500	361,650	304,500	4 ft. 8½ in.
Chicago Great Western	10	2-6-6-2	23 & 35 x 32	57	205	73,000	353,100	307,000	4 ft. 8½ in.
Chicago, Milwaukee & St. Paul	25	2-6-6-2	23½ & 37 x 30	57	200	75,000	387,500	321,500	4 ft. 8½ in.
Columbia National	2	0-6-6-0	13 & 20½ x 20	38	200	23,400	128,000	128,000	3 ft.
Delaware & Hudson	6	0-8-8-0	26 & 41 x 28	51	220	106,000	445,000	445,000	4 ft. 8½ in.
Denver & Rio Grande	8	2-6-6-2	20½ & 33 x 32	57	210	66,000	335,000	291,500	4 ft. 8½ in.
Denver, Northwestern, Pacific	2	0-6-6-0	21 & 33½ x 32	55	225	78,400	335,000	335,000	4 ft. 8½ in.
Denver, Northwestern, Pacific	7	0-6-6-0	21 & 33½ x 32	55	225	78,400	326,000	326,000	4 ft. 8½ in.
Denver, Northwestern, Pacific	1	0-6-6-0	20½ & 33 x 32	55	225	73,900	328,000	328,000	4 ft. 8½ in.
Duluth, Missabe & Northern	8	2-8-8-2	26 & 40 x 32	57	200	91,300	448,100	406,600	4 ft. 8½ in.
Eastern Railway of France	2	2-6-6-0	17½ & 28 x 26	50	200	42,300	206,000	182,000	4 ft. 8⅞ in.
Eastman, Gardner & Co.	1	2-4-4-2	15 & 23 x 22	40	200	28,200	152,900	121,000	4 ft. 8½ in.
Erie	3	0-8-8-0	25 & 39 x 28	51	215	94,800	410,000	410,000	4 ft. 8½ in.
Great Northern	45	2-6-6-2	20 & 31 x 30	55	210	55,000	302,650	263,350	4 ft. 8½ in.
Great Northern	22	2-6-6-2	21½ & 33 x 32	55	200	64,500	355,000	316,000	4 ft. 8½ in.
Great Northern	35	2-6-8-0	23 & 35 x 32	55	200	73,800	378,300	359,600	4 ft. 8½ in.
Guayaquil & Quito	2	0-6-6-0	12½ & 19 x 20	37	200	20,300	114,100	114,100	3 ft. 6 in.
Imperial Government (Japan)	6	0-4-4-0	15½ & 24½ x 24	49	180	27,600	122,000	122,000	3 ft. 6 in.
Ingenio, Angelina, Santa Domingo	1	2-6-6-2	10 & 15 x 16	33	180	10,500	60,200	51,900	2 ft. 6 in.
Little River	1	2-4-4-2	14 & 21 x 22	44	200	23,500	141,700	111,500	4 ft. 8½ in.
Mexican Central	1	2-6-6-2	21½ & 33 x 32	55	200	64,500	309,450	272,950	4 ft. 8½ in.
Mexican International	20	2-6-6-2	21½ & 33 x 32	56	220	69,500	338,500	298,200	4 ft. 8½ in.
Mogyana Railway	2	2-6-6-2	17 & 26 x 22	45	200	33,800	189,800	161,100	3 ft. 3⅜ in.
Natal Government	1	2-6-6-0	17½ & 28 x 26	45½	200	46,600	196,000	179,500	3 ft. 6 in.
Natal Government	5	2-6-6-0	21 & 33½ x 32	55	200	46,600	208,000	191,000	3 ft. 6 in.
New York Central Lines	25	2-6-6-2	21½ & 34 x 32	57	200	68,300	354,000	307,000	4 ft. 8½ in.
Norfolk & Western	5	0-8-8-0	24½ & 39 x 30	56	200	85,000	376,000	376,000	4 ft. 8½ in.
Norfolk & Western	5	2-8-8-2	24½ & 39 x 30	56	200	77,000	390,000	360,000	4 ft. 8½ in.
Northern Pacific	6	2-6-6-2	20 & 31 x 30	55	210	55,000	305,150	262,350	4 ft. 8½ in.
Northern Pacific	16	2-6-6-2	21½ & 33 x 32	55	200	64,500	351,600	313,550	4 ft. 8½ in.
Northern Pacific	5	2-8-8-2	26 & 40 x 30	57	200	85,500	437,950	403,800	4 ft. 8½ in.
Oregon R. R. & Nav. Co.	3	2-8-8-2	26 & 40 x 30	57	200	85,500	438,850	402,750	4 ft. 8½ in.
Pekin-Kalgan	4	2-4-4-2	15 & 23 x 22	48	210	26,000	163,000	130,000	4 ft. 8½ in.
St. Louis & San Francisco	7	2-8-8-2	24½ & 39 x 30	57	200	83,300	418,000	360,000	4 ft. 8½ in.
Sorocabana	4	2-6-6-2	17 & 26 x 22	45	200	33,800	190,800	161,200	3 ft. 3⅜ in.
Sorocabana	6	2-6-6-2	16 & 25 x 20	41¾	200	29,400	150,600	132,000	3 ft. 3⅜ in.
South African Railway	1	2-6-6-2	18 x 26 & 28½ x 28	46 h.p. / 51 l. p.	200	46,400	230,000	196,000	3 ft. 6 in.
South African Railway	5	2-6-6-2	18 & 28½ x 26	46	200	48,100	230,000	196,000	3 ft. 6 in.
Southern	2	2-6-8-0	23 & 35 x 32	56	200	72,700	363,500	332,700	4 ft. 8½ in.
Southern Pacific	12	2-6-6-2	21½ & 33 x 30	57	200	58,500	338,950	297,550	4 ft. 8½ in.
Southern Pacific	2 / 27	2-8-8-2	26 & 40 x 30	57	200	85,500	425,900 / 437,000	394,000	4 ft. 8½ in.
Southern Pacific	12	2-6-6-2	25 & 38 x 28	63	200	66,500	385,000	320,000	4 ft. 8½ in.
Union Pacific	3	2-8-8-2	26 & 40 x 30	57	200	85,500	438,850	402,750	4 ft. 8½ in.
Virginian	8	2-6-6-0	24 & 36 x 32	56	210	82,800	388,320	356,780	4 ft. 8½ in.
Virginian	1	2-8-8-2	26 & 40 x 32	56	210	97,000	448,750	405,400	4 ft. 8½ in.
Virginian	4	2-6-6-0	22 & 32 x 30	54	200	71,000	323,000	301,500	4 ft. 8½ in.
West Side Belt	2	0-6-6-0	20½ & 33 x 32	55	225	74,100	326,000	326,000	4 ft. 8½ in.
Western Maryland	2	2-6-6-2	23 & 35 x 32	55	200	73,700	342,000	298,100	4 ft. 8½ in.
Western Maryland	2	2-6-6-2	23 & 35 x 32	55	200	73,700	354,000	310,000	4 ft. 8½ in.
Whitney Co., Ltd.	1	2-4-4-2	15 & 23 x 22	48	200	24,800	162,650	129,850	4 ft. 8½ in.

General News Section.

The Chicago, Burlington & Quincy is using, experimentally, between Chicago and Galesburg, 163 miles, a printing telegraph, known as the Morkrum apparatus.

On some of its trains "de luxe" the Pullman Company now provides passengers who sleep in the lower berths with coat hangers, to be suspended from the edge of the upper berth.

The roundhouse of the Chicago, St. Paul, Minneapolis and Omaha, at Omaha, Neb., was burned on April 16, causing an estimated loss of $50,000. Ten locomotives were damaged.

A bill has been introduced in Congress to prohibit express companies from competing with the post office department in the transportation of packages weighing less than 11 lbs. each.

Judge J. H. Henderson, of Indianola, Iowa, has been appointed to the newly created office of commerce counsel for the state of Iowa, his nomination by the members of the state railway commission having been confirmed by the senate.

The Southern Pacific has completed the electrification of its line between Clement Junction and Centous, Cal., near Los Angeles. The line will be used by the Pacific Electric mainly for freight, and will be known as the Santa Monica Air Line (distance 12 miles.)

The legislature of Pennsylvania has before it a bill, the principal features of which have been approved by one or the other of the two Houses, which provides for the expenditure of $6,000,000 for the construction of wagon roads. The plan includes the establishment of 300 routes between county seats.

At Syracuse, Kan., April 13, the conductor of passenger train No. 5 of the Atchison, Topeka & Santa Fe, was shot and injured by a train robber, having resisted the robber as he got on to the train. After robbing the conductor and one brakeman of what money they had, the robber stopped the train and escaped.

J. C. Stubbs, vice-president and director of traffic of the Harriman Lines, with office at Chicago, has announced that he will retire from railway work in about a year. Mr. Stubbs is 64 years old, and for over 40 years of his life he has been on the pay-roll of the Southern Pacific. He says he concluded long ago that when a railway officer is 65 years of age he should retire.

A bill has passed the lower house of the Michigan legislature which requires a man to have had at least one year's experience as a fireman before he can become an engineer in charge of a freight train, that all conductors on passenger trains must have had at least a year's previous experience as conductors on freight trains, and that only experienced brakemen shall act as flagmen.

Senator Jones, of the state of Washington, has introduced in Congress the bill which he presented in the last Congress, designed to provide for uniform train-operating rules for the railways of the country, by enforcing a standard code by authority of the federal government. The bill to limit the working time of trainmen to 14 hours a day—two hours less time than that provided in the present statutory limit—has also been re-introduced.

The commercial club of Topeka, Kan., gave a dinner on the evening of April 11 in honor of H. U. Mudge, president of the Rock Island Lines, and other officers of that road, including F. O. Melcher, second vice-president; John Sebastian, third vice-president; H. Gower, freight traffic manager, and E. B. Peirce, general solicitor. Talks were made by Mr. Mudge and members of his staff as well as by officers of the Santa Fe and several business men of Topeka. About 175 persons were present.

Walter L. Ross, vice-president in charge of traffic of the Chicago & Alton and the Toledo, St. Louis & Western, made an address before the Chicago Transportation Association on April 17, in which he said that "there is now no branch of railway ownership and operation that cannot be discussed freely and frankly and with advantage to the railways themselves." He said the railways welcome reasonable regulation as proper and necessary, but that reductions in rates should not be fixed by the same bodies that demand expensive improvements.

The legislature of New Hampshire, which has just adjourned, passed a law providing for the establishment of a public service commission; but at the same time adopted a separate law in regard to freight rates, directing the public service commission to make a general investigation and report to the next legislature; and the rates now in force are legalized until July 1, 1913; but the law contains a clause leaving shippers free to recover excess charges on a finding of the commission. This proviso applies to certain rates (not all rates) now in force. A workmen's compensation act was also passed.

The bill before the New York State Legislature, looking to the establishment of docks, harbors and other terminal facilities at numerous points on the line of the Erie canal, calls for an expenditure of $18,600,000, which is about two millions more than was provided for in the estimates of the commission. Representatives of business interests in a number of cities have met at Albany and approved the proposed action by the legislature; and the addition to the commission's estimates is to provide for harbors at Lyons, Rome, Herkimer, Little Falls, Clyde and Plattsburg, which were not included in the original scheme.

Newspaper reporters in several cities learn that the Pennsylvania is to take off two of its fast trains between New York and St. Louis; Nos. 40 and 41; and also possibly other trains. The New York Central has changed the time of its Southwestern Limited. It now leaves New York at 4 p. m. and arrives at St. Louis at 3 the next afternoon. The La Salle Street Limited, leaving New York for Chicago at 5 p. m., has been consolidated with the Wolverine, heretofore leaving at 4:30. The train will arrive at Detroit at 7:15 a. m. and Chicago 2 p. m. Eastbound a new train, "The Detroiter," leaves Detroit at 6:40 p. m. and arrives in New York at 9:25 a. m. The Central's fast train from St. Louis leaves that city at 5 p. m., instead of 8:45 a. m., and arrives in New York at 6 p. m. This train makes a daylight run from Buffalo to New York in 8 hours 40 minutes.

The Atchison, Topeka & Santa Fe now has in operation 51 circuits on which telephones are used, most of them train wires. The aggregate length of these circuits is 7,105 miles. The sections or divisions of railway of which these wires are a part of the operating equipment aggregate a length of 5,756 miles, a number of sections of road being equipped with two circuits, one for the use of despatchers, and one for messages. Between Amarillo, Texas, and Waynoka, Okla., 207 miles, there are three circuits, one for the despatcher, one for the joint use of the railway company and the Western Union Telegraph Company for messages, and one devoted wholly to railway messages. There are three circuits also on the line between Amarillo and Clovis, N. M., 104 miles. On the 51 circuits there are 976 offices, an average of 19 telephones to each circuit. The selectors used are the Gill E-2; the Gill X and the Western Electric Company's; and, on two circuits, the Kellogg. No. 9 copper wire is used for nearly all of the circuits.

Commenting on the recent decision of Judge Sanborn in the Minnesota rate case, Governor Hadley of Missouri said he regarded it, in so far as it affects the powers of the states, as the most important rendered by the federal courts since the Dred Scott decision. He said that "if this decision were sustained by the United States Supreme Court it would seriously impair, if not totally destroy, the police power of a state in so far as that power relates to the regulation of corporations engaged in interstate commerce. This would certainly be a 'new nationalism' with a vengeance. The logical and necessary result of the decision, if sustained, will be that states eventually will become more geographical subdivisions possessing and exercising no powers of government except those which pertain to purely local affairs." As Judge Sanborn brought out a vital point in connection with the power of the state to regulate corporations doing an interstate business, his decision will have an important bearing on the Missouri rate cases which have been reopened for argument in the United States Supreme Court, and it is

said that Governor Hadley may ask the supreme court to let him participate in the arguments.

The house committee on railways of the Illinois legislature has reported favorably on the bill which is proposed to take the place of the present state railway commission law. In addition to the powers conferred by the present law, the substitute measure provides that the commission shall have the following additional powers: Jurisdiction over the subject of car demurrage, of refund or overcharge on freight rates and return of overcharge on passenger rates; power to fix through routes and rates; power to fix joint rates; jurisdiction over express companies, steamboat lines and sleeping car companies; authority to require interchange of cars between common carriers; jurisdiction to determine rules or rates for storage and other charges incident to the transportation of freight; power to compel physical connection between common carriers; authority to establish switching rules and regulations and to fix the limits of switching districts, and authority to make investigation of the general business management of common carriers in relation to the distribution of cars, granting of sidings, location of passenger and freight stations, and use and compensation for cars owned or controlled by common carriers. It also provides that the orders of the commission shall be mandatory and enforced by the state courts, just as the orders of the Interstate Commerce Commission are carried out by the federal courts.

Hydroplane Record.

Sir John I. Thornycroft, according to an account in *Engineering* (London), of April 7, in his hydroplane launch "Maple Leaf III," has traversed a nautical mile at the rate of over 58 miles an hour. This was on a measured course. "The Maple Leaf III" is 40 ft. long, with a beam of 9 ft. The boat has twin screws, and each of the two engines has 12 cylinders.

H. G. Burt Chairman of Chicago Electrification Commission.

Horace G. Burt, formerly president of the Union Pacific, has been appointed chief engineer of the Chicago Association of Commerce commission on electrification, and will open an office in the People's Gas building, about May 1. At a meeting held at the Union League club in Chicago on April 14, the following were appointed members of the special committee in charge of the various electrification problems: W. F. M. Goss, of the University of Illinois; H. G. Hetzler, Chicago & Western Indiana, and E. R. Graham, of D. H. Burnham & Co. Mr. Burt, who will have a number of assistants to help him in making a systematic study of the conditions, has been in railway work since 1868, when he became a rodman on surveys on the St. Louis, Vandalia & Terre Haute. Afterward he worked with a locating party on construction of railways in Kansas. He graduated from the University of Michigan in 1873, after which he went into the engineering department of the Chicago & North Western, becoming chief engineer of that road in 1881. He then entered the operating department and held various important operating positions on that and other roads, rising to the presidency of the Union Pacific in 1898, which position he held for six years.

Three-Phase Electric Locomotives in Italy.

Tests made by the Italian State Railway on three-phase electric locomotives built by the Societe Italiana Westinghouse, present some interesting results. The locomotives were built for heavy freight service in the Giovi tunnel and have a normal operating speed of 28 m.p.h. They do not weigh more than 60 tons, but the weight may be increased to 75 tons by means of ballast. During the tests a train of 418 tons, exclusive of the weight of the locomotive, was taken with a speed of 28 m.p.h. from Pontedecimo to Busalla, a distance of 6½ miles with a maximum grade of 3.50 per cent., an average grade of 2.70 per cent., and a minimum curve radius of 1,200 ft. After this the train was taken back at a speed of 14 m.p.h., the locomotive being connected for regenerating power. The time allowed for one round trip was 140 minutes. After 20 hours of such continuous operation, one round trip without forced ventilation of the motors was made with a temperature rise of the motors considerably less than 135 degs. F. The one hour motor rating for the same temperature is 720 h.p. per motor corresponding to a locomotive pull at the wheel circumference of 19,500 lbs.; during the test this rate was exceeded. The friction rating under the most unfavorable conditions is such that a train of 380 tons, exclusive of the weight of the locomotive, may be accelerated to 28 m.p.h. in less than 200 seconds by two locomotives, one pushing and one pulling on a grade of 3.50 per cent. and on a curve of not more than 1,200 ft. radius. One locomotive can accelerate a train of 400 tons, not including the weight of the locomotive, to a speed of 14 m.p.h. on a grade of 3 per cent. and 300 tons on a curve of 540 ft. radius thirty times in one hour.

The motors are three-phase, 3,000-volt, 15-cycle machines arranged to give two synchronous speeds of 112½ and 225 r. p. m.; intermittent speeds are obtained by inserting rheostats in the circuit. Electrification became necessary on the Giovi line on account of the impossibility of coping with the increase in traffic with steam locomotives. The artificial ventilation of the tunnel, owing to its great length, could not be improved and the condition of the atmosphere in the tunnel was such that an increase in the number of trains or steam locomotives would endanger the safety of the service. An important feature of the three-phase installations is found in the utilization of regenerated power, which reduces the cost of operating the line and also reduces, by proper arrangement of the schedules, the peak of the load in the generating station and does not require the use of mechanical brakes when the train is going down grade.

Aviators' Records.

In Belgium, April 14, an aeroplane was flown about 55 miles carrying three passengers—the three sisters of Lanser, the man who was running the machine. The flight of Pierre Prier from London to Paris, reported in our last issue, which was at the rate of 70.14 miles an hour for about 290 miles, was faster than any trip for so great a distance which has ever been made by a locomotive, so far as the records show, though possibly the special train which was run over the Lake Shore & Michigan Southern on June 13, 1905, nearly or quite equalled it. In this Lake Shore run, a distance of 525 miles was made at 69.53 miles an hour; almost equal to the rate made by the monoplane, and the distance was much farther. The Locomotive Dictionary list of best recorded speeds made by steam locomotives shows a run on the Pennsylvania Lines October 24, 1905, of 257 miles at 74.55 miles an hour. A significant thing to remember in comparing these records is that the flying machine, by reason of its lightness and its shape, may be greatly helped or retarded by wind.

The New Haven's Advice to Boston.

President Mellen, of the New York, New Haven & Hartford, speaking at a dinner of the Boston Chamber of Commerce on Thursday of last week, told the citizens of Boston, in substance, that they ought to wake up, and get the better of New York. The large new trans-Atlantic steamships are having difficulty in getting satisfactory dock facilities at New York and their owners have been looking at New London and also have been considering Montauk Point, but Boston could beat either of those ports if she saw fit to do so. She could prepare her docks in far less time than suitable preparations could be made anywhere else; and the New Haven road will take the passengers from Boston to New York so quickly that they will reach there earlier than would be possible if the ship sailed direct to New York. If Boston will build a dry dock for the repair of these large vessels she can have a "call" upon them. If Boston will improve her water-front and put up fireproof buildings on the piers, then Mr. Mellen will furnish the traffic. Speaking both for the New Haven and the Boston & Maine he said:

The arrangements of our company are such that I feel sure I am not at all drawing upon my imagination when I say, we are practically in alliance with the Pennsylvania Railroad, through the New York Connecting Railroad which we are jointly building, with the New York Central Railroad, through the Grand Central Station investment, and our recent arrangements regarding the Boston & Albany and Rutland roads,—and I feel more than certain within no great while we shall have most intimate arrangements with Canadian lines, in view of which there is promise of a business such as we have never before been able to consider in the way of cargo for such steamships as shall seek this port.

Railway Prospects in the South.

Atlanta itself sets at naught all the traditions of the more remote past and brings to our minds the knowledge that the introduction and development of railways has meant the establishment of a new industrial force in the progress of this country and has demonstrated that great industrial centers may exist and thrive away from locations which were formerly considered necessary to substantial commercial progress.

Men who had studied the past and gathered together the experience of former ages would have sought at the water's edge the location of Georgia's future commercial and industrial center. Probably at some ample harbor on the seacoast, or at least on the banks of some navigable stream. That Atlanta exists as a dominating factor in the commerce of the South, indicates that some new principle has become a part of our economic development.

The construction of railways in the early history of the South possessed but few attractions to those who had money to invest in business enterprises. The experiment was considered doubtful and the undertaking highly speculative; and, although the necessity and advantage of more adequate transportation facilities were recognized, and appreciated as being important in the development of the country, yet so indifferent was private capital to venture upon an undertaking both costly and uncertain, that very few of the roads of the South in its early history were constructed purely through individual contribution. As a matter of fact, the promotion and construction of most of the earlier built roads was the result of the co-operation of the state with individuals, to which was generally added the aid of communities and cities whose interest it was thought would be particularly advanced by such construction.

Many causes co-operated to bring about the final abandonment by the states of their control and interest in their railways, but chiefly was this policy of abandonment due to the conviction on the part of the people that the operation of railways, involving the employment of vast numbers of men and the inauguration of competition between sections and cities equally entitled to protection and consideration from the state, made it impossible for the state wisely and efficiently to carry on these complicated and hazardous undertakings.

After the civil war the states did not undertake to rehabilitate the roads, but usually turned them over to companies financed by individuals and, for all practical purposes, we may say that the growth of railways in the South since the year 1865 has been the result of individual enterprise and corporate energy. Those railways which existed at the close of the war represented, as many of you well know, but little else than a franchise and a right of way, and the work of the years that had gone before had been to a large extent annihilated as the result of four years of enforced neglect, and I defy any one to name another kind of property that deteriorates as rapidly as a railway, resulting from lack of repair. Eternal vigilance, and no small amount of money, is the price that must be paid for the maintenance and continued existence of a railway, yet these roads have been reconstructed and new lines have been built to an extent that has been marvelous, considering the difficulties that had to be overcome.

In 1890, the capitalization of the railways in this territory, which capitalization includes the outstanding stock and funded debt of those roads, was $1,153,374,401. This capitalization in 1909, had increased to $2,265,101,150. I have no means at hand for ascertaining how much of this capitalization has been contributed by the people of the South, but I think that it is safe to say that a very small portion has been secured from that source and I take it that, from that reason, much credit is due to the people—mostly your own citizens—who have had the character and ability, so to impress themselves upon the investing public of the world whereby such large sums of money have been entrusted to their care and placed at the service of your communities, to be primarily benefitted by the construction and upbuilding of these railways. This money has been secured, and expended for the benefit of this territory, although the return thereon has, in most cases, been very meager, and the average return much less than reasonable. Interest on bonds and dividends on stock which have been received on account of railway investments in the South from 1891 to 1909, both inclusive, represent a rate of interest upon this capitalization ranging from 2.54 per cent. to 3.60 per cent.

No small portion of the stock of existing companies, which is now frequently being criticized as "watered stock," represents, as a matter of fact, stock issued to the original owners of the road, which was turned over after the war to some new company being organized for the purpose of constructing and maintaining a through line of travel, and represented only a small portion of an actual investment in money. This stock, in fact, represented, in many cases, the fortunes of not a few courageous men who invested their all in the railways of the South, and because an effort has been made to preserve this investment to the original owners or to their successors in title, the opportunity is frequently sought in these days to criticize stock issued for such purposes as being unentitled to recognition as an investment. I cannot agree with this theory, but have always felt that the money which was originally contributed is a part of the investment, the benefit of which is now enjoyed by the public and which in good conscience should be preserved to those entitled to it.

Deducting the amount of stock of one railway held by another railway from the total capitalization, the average per mile valuation of the roads of the South is $44,911.

And now, coming to the question of what the prospects of the railways in the South are: From my observation and general knowledge of the southern section of our country, I unhesitatingly express the opinion that there is no section of our country that has a brighter prospect for full development by its railways than that section lying south of the Ohio and east of the Mississippi rivers, and extending also westward from the Mississippi river on the northern border of the gulf of Mexico, provided an energetic, comprehensive, and proper financial support is given to the matter of better farming, thereby diversifying your crops, enriching your lands, utilizing your water power, and, in fact, bringing this vast area of tillable and productive land into and under correct and effective cultivation.

You should not be satisfied with merely being represented before the world as the grower of one article, notwithstanding the common parlance "Cotton is King." You have the best climate on the face of the globe. You have, as a rule, sufficient rainfall to furnish moisture necessary to the growth of all characters of crops; you are in easy access to transportation to all parts of the world, and with the completion of that undertaking to which our government is committed, viz., the Panama Canal, you will then be at the door of Central America, South America, and many thousands of miles nearer to the Pacific coast, China, and Japan, than any competing section or territory.

And now, if you again ask what are the "Railway prospects of the South," my reply is that the future development of the railway in the South is, to my mind, entirely dependent upon the attitude of the southern people towards the railways.

It seems to me that recent history has demonstrated that the day is past when the railway question can be properly dealt with as a political proposition. In fact, it is altogether an economic proposition and cannot be successfully handled by the politicians, however sincere may be their ultimate purpose. Such attempts have always resulted in disaster to the roads as well as to the community. I do not, however, conceal from myself the fact that all railways are in some measure monopolies and as such should be subject to the regulating hand of the body politic. In the working out of our system, we have established both for the nation and for most of the states, commissions, whose duty it is to exercise regulating influences to prevent the evils that arise from monopoly; and if, as the years go by, it shall appear that these bodies will be able, with equal hand, to protect all sections from undue discrimination and, at the same time, preserve to the railways such rates that the revenues shall be remunerative, then I look forward to the early day when railway development in the South shall take steps far in advance of any section of this country.

One more word and I have finished. All of these things I believe will be finally and best accomplished when the people of the South get in the habit of owning their own railways. Stocks and bonds of these companies can be purchased on the open market today at prices which will justify a reasonable return under fair and just governmental regulations, and I do not know any better opportunity for investment by the people of the South than in the securities of their own transportation companies.—*L. E. Johnson* in an address before the Southern Commercial Congress.

National Association of Manufacturers.

The sixteenth annual convention of the National Association of Manufacturers will be held at the Waldorf-Astoria Hotel, New York, May 15-17. Among the labor problems which will be considered are the prevention of accidents and the question of industrial relief. The results of the investigations made in Europe by the association's special commissioners, F. C. Schwedtman and James A. Emery, covering the subjects of accident prevention and industrial relief, will be presented in the form of a report to the convention. A special feature will be made of banking and currency, and the attitude of our manufacturers toward the plans recently proposed to reform our banking and currency systems will be discussed. Other questions of economic importance, such as immigration, industrial education, a reform of our patent laws and the creation of an independent tariff commission of experts will be considered. The sessions will be open to the general public and the association extends a cordial invitation to all manufacturers to attend, whether members of the association or not.

Transportation Club of San Francisco.

At the annual meeting of this club the following officers were elected for the ensuing year: President, A. G. D. Kerrell, general passenger agent of the Pacific Mail Steamship Company; first vice-president, E. E. Wade, assistant general passenger agent of the Southern Pacific; second vice-president, Thomas Finigan, purchasing agent of the United Railroad of San Francisco; treasurer, Henry Avila, city ticket agent, Union Pacific; secretary, Theo. H. Jacobs, city passenger agent, Union Pacific. This club publishes a monthly periodical called "The Time Card." It is edited by the publicity committee, W. F. Schmidt, chairman, and the last number contains portraits of the officers of the club.

Civic Forum.

Under the auspices of the Civic Forum, New York, Frederick W. Taylor, of Philadelphia, Pa., the originator of the movement known as scientific management, will, on April 28, make an address on The New Conception of Business and Industrial Efficiency, in Carnegie Hall. Brief addresses will also be made by John Golden, president of the United Textile Workers of America, on the attitude of organized labor towards this movement, and by Frank B. Gilbreth, on its practical operation. Details regarding tickets may be obtained at the office of the Civic Forum.

Western Railway Club.

At the meeting of the Western Railway Club, held in Chicago, April 18, the reports of the committee on revision of the rules of interchange and of the special committee on joint interchange and inspection bureau at the Union Stock Yards, Chicago, were taken up.

American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers, held on April 19, a paper entitled Some Tests of Large Steel Columns, by James E. Howard, was presented for discussion. This paper was printed in the *Proceedings* for February, 1911.

American Institute of Electrical Engineers.

A convention of the American Institute of Electrical Engineers will be held at Los Angeles, Cal., April 25-28.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; annual convention, May 23-26, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting, June 22, 1911, Niagara Falls, N. Y.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., Sept. 19, 1911.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.; June 20-23, Kansas City, Mo.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; May 17, New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 17-19, 1911, St. Louis, Mo.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago.

AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 9-10, 1911, Detroit, Mich.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; June 27-July 1, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York; 3d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York; next convention, May 30-June 2, Pittsburgh, Pa.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911, New Orleans, La.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May 24-26, Montreal, Can.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; semi-annual, June 16-17, Washington, D. C.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911, Boston, Mass.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York; June 20-21, Cape May City, N. J.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan., and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Waren P. Taylor, Richmond, Va.; June 21, St. Paul, Minn.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Judson, 209 East Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; May 23-26, Omaha, Neb.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911, Chattanooga, Tenn.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; July 25-27, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; Sept. 12-15, 1911, Atlantic City, N. J.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Maclove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.; June 13, New York; annual, Oct. 10, Colorado Springs, Colo.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; annual, May 22-24, 1911, Milwaukee, Wis.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Oct., 1911, St. Louis.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Sept. 12-14, St. Paul, Minn.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept. Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911, Baltimore, Md.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; annual, August 29-September 1, Chicago.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.

WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank bldg., Chicago.

Traffic News.

In accordance with the decree handed down by Judge Sanborn in the Minnesota rate case, the railways operating in that state will restore 3-cent passenger fares on June 1.

The Santa Fe has removed its 100-mile limit rule in regard to tickets on its California Limited west of Albuquerque. Heretofore it has been impossible to buy a ticket good on this train for a distance less than 100 miles.

Effective May 20 the Erie will establish a passenger rate of $9.50 between Chicago and Pittsburgh, thus making its rate between those points the same as that of the Lake Shore, the Pan Handle and the Baltimore & Ohio.

The Adams Express Company is now able to run cars from the Atlantic to the Pacific coast, having made a traffic agreement with the Globe Express Company, which operates over the Denver & Rio Grande and the Western Pacific.

The Dixie Cotton Oil Company of Argenta, Ark., has filed suit at Little Rock, Ark., against the St. Louis, Iron Mountain & Southern for $169,000 damages. The oil company alleges that the road discriminated in favor of the Buckeye Cotton Oil Company in the matter of switching charges.

While the volume of freight traffic on all the roads in the United States increased 7.6 per cent. for the year 1910 over 1909, the increase on the roads of the Southeastern states was 10.1 per cent., and while the volume of passenger traffic on all the roads increased 6.1 per cent., the increase in the Southeastern states was 10.0 per cent.

The lower house of the Minnesota legislature has passed the Cashman bill, which provides that railway freight rates shall be based on actual mileage. If this measure were enacted it would annul the state commodity and merchandise laws which the recent decision of the United States Circuit Court of Appeals held to be unconstitutional.

Statistics covering the 30-day period ended April 10, when the special colonist passenger rates to the west were in effect, have been prepared by several of the railways engaging in that business, and show that the traffic from the east, north and south to points in California and other western and northwestern states was more than 20 per cent. greater in 1911 than last year, 85,000 persons having taken advantage of the special rates.

The expenditures for maintenance of way and structures in 1910 for the railways of the entire United States showed an increase of 11.3 per cent. over 1909, while the expenditures for the railways of the Southeastern states showed an increase of 15.8 per cent., and while the expenditures for maintenance of equipment for the entire United States showed an increase of 9.6 per cent., the increased expenditures of the railways in the Southeastern states under this heading amounted to 13.2 per cent.

Mayor W. J. Gaynor of New York City has announced that he intends to ask the Interstate Commerce Commission to admit the city as an intervenor in the case which has been presented by the Chamber of Commerce and other mercantile associations, complaining against the differentials in freight rates between the Atlantic seaboard and the West, under which Philadelphia and Baltimore have rates lower than those to and from New York; and Mr. Gaynor has written to the governor of the state, asking him to take similar action on behalf of the state.

As a result of an opinion handed down by the supreme court of Oklahoma, the corporation commission of that state will have to hold further hearings in connection with express rate reductions which it has ordered. The express companies involved have represented to the court that since the original order of the commission was made they have filed with that body reports which give it more accurate information on which to base proposed changes in the rates, and the court has instructed the commission to report its additional findings within 60 days.

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting

CAR BALANCE AND PERFORMANCE IN DECEMBER, 1910.

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	80,563	710,327	217,449	176,536	166,251	390,355	17,714	137,355	27,206	140,050	106,395	2,170,199
Average number of system cars on line	37,711	384,780	114,061	90,682	79,166	263,274	6,449	71,518	16,613	62,852	69,671	1,196,777
Railway-owned cars: Average foreign on line	47,919	312,350	101,025	74,105	70,052	144,556	13,400	72,091	28,085	60,753	33,638	957,974
Total Railway-owned cars on line	85,630	697,130	215,086	164,787	149,218	407,830	19,849	143,609	44,698	123,605	103,309	2,154,751
Excess	5,067	.....	.....	.....	.....	17,475	2,135	6,256	17,492	.....	.....	.....
Per cent. of cars on line to total owned:												
Home	47	54	52	52	48	67	36	52	61	45	65	55
Foreign	59	44	46	41	42	37	76	52	103	43	32	44
All railways	106	98	98	93	90	104	112	104	164	88	97	99
Private cars on line	3,416	43,592	11,306	3,112	6,324	15,708	1,960	8,075	2,973	10,577	2,572	109,615
Total, all cars on line	89,046	740,722	226,392	167,899	155,542	423,538	21,809	151,684	47,671	134,182	105,881	2,264,366
Per cent. of cars in shop	4.18	5.14	9.60	5.96	7.92	5.69	5.36	6.64	4.42	4.42	6.57	5.96
No. of freight engines owned	1,160	10,328	2,919	3,032	2,483	6,278	495	2,763	715	2,566	2,164	34,903
Average cars on line per freight engine owned	77	72	78	55	63	67	44	55	67	52	49	65
Total freight-car mileage	44,031,841	515,714,639	145,320,504	119,855,773	122,101,565	282,188,640	24,231,845	90,845,895	36,163,019	124,981,227	86,126,587	1,591,561,535
Average miles per car per day	16.0	22.5	20.7	23.0	25.3	21.5	35.3	20.3	24.5	30.0	26.2	22.7
Per cent. loaded mileage	72.3	67.2	67.7	67.7	72.1	71.6	72.9	71.0	68.9	70.6	78.4	69.7
Ton-miles of freight, including company freight	494,247,289	8,179,706,416	2,169,591,621	1,868,314,986	1,786,123,335	2,618,067,125	383,626,272	1,360,088,401	433,993,730	1,858,566,841	1,369,125,420	22,521,451,436
Average ton-miles, including company freight:												
Per car-mile	11.2	15.9	15.5	15.6	14.8	14.4	16.6	15.0	12.0	15.1	15.9	15.2
Per loaded car-mile	15.5	23.6	22.5	23.0	18.7	20.8	22.7	21.3	17.4	21.4	20.3	21.8
Per car per day	179	356	325	359	373	323	626	303	294	453	417	349
Gross freight earnings	$5,564,563	$47,748,045	$12,457,866	$11,687,311	$12,135,665	$28,709,600	$3,045,771	$11,720,405	$4,138,628	$18,423,020	$8,708,954	$164,339,828
Average daily earnings: Per car owned	$2.23	$2.17	$1.85	$2.14	$2.35	$2.37	$5.55	$2.75	$4.91	$4.24	$2.64	$2.44
Per railway car on line	2.10	2.21	1.87	2.29	2.62	2.27	4.95	2.63	2.99	4.81	2.46	2.46
All cars on line	2.02	2.08	1.78	2.25	2.52	2.19	4.51	2.49	2.80	4.43	2.65	2.34

statistical bulletin No. 94, covering car balance and performance for December, 1910, says:

"There was a decrease in the revenue per mile and an increase in operating expense per mile, the net result being an increase in the ratio of expenses to revenue. The items of car performance show a decrease corresponding with these results. Following is a comparative summary for a few selected averages:

	December, 1910.	November, 1910.	December, 1909.
Gross revenue per mile of road	$981.	$1,031.	$928.
Freight revenue per mile of road	677.	735.	645.
Average freight cars owned per mile of road	9.73	9.66	9.40
Average miles per car per day	22.7	24.3	22.2
Per cent. loaded mileage	69.7	70.1	69.9
Per cent. home cars on line	55.1	55.0	56.2
Tons per loaded car	21.8	22.5	22.2
Ton miles per car per day	349.	385.	342.
Daily earnings per car on line	$2.34	$2.66	$2.30

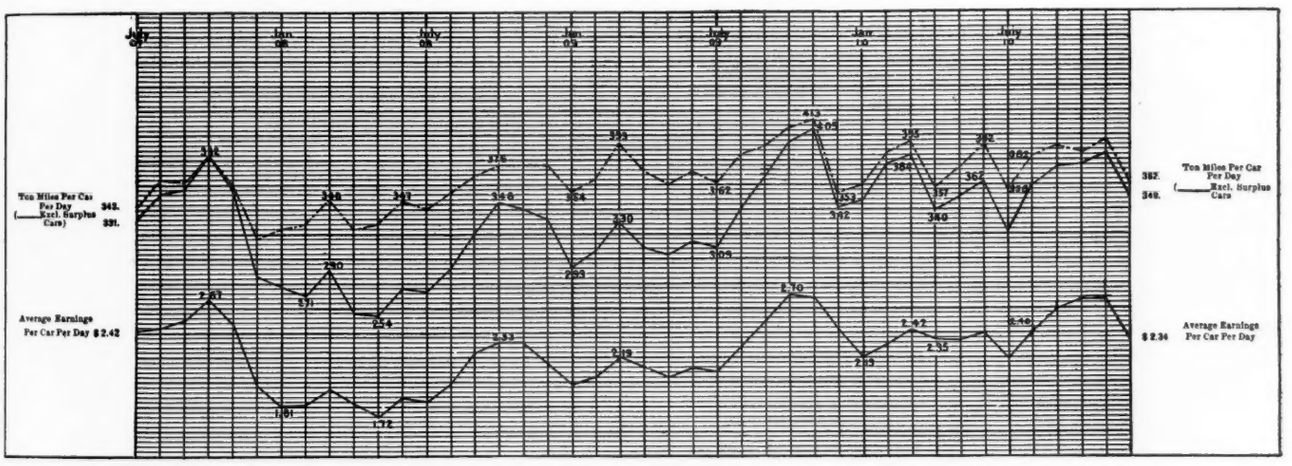
"It will be noted that in the main the performance in December, 1910, was similar to the December, 1909, performance, with a slight improvement in the principal items. As the number of idle cars during the two periods was practically the same, the averages per car are fairly comparable, although allowance should be made for the increased equipment per mile of road from 9.40 in December, 1909, to 9.73 in December, 1910, the increase being equivalent to 3.51 per cent. It is probable that in this increase we can find the explanation for the fact that the freight revenue per mile of road increased in greater proportion than the revenue per car on line

"Comparing the December results with those for November there is very little out of the ordinary December performance, excepting the fact that there was practically no change in the per cent. of cars on their home line, although the decrease in the per cent. of loaded mileage continued during December."

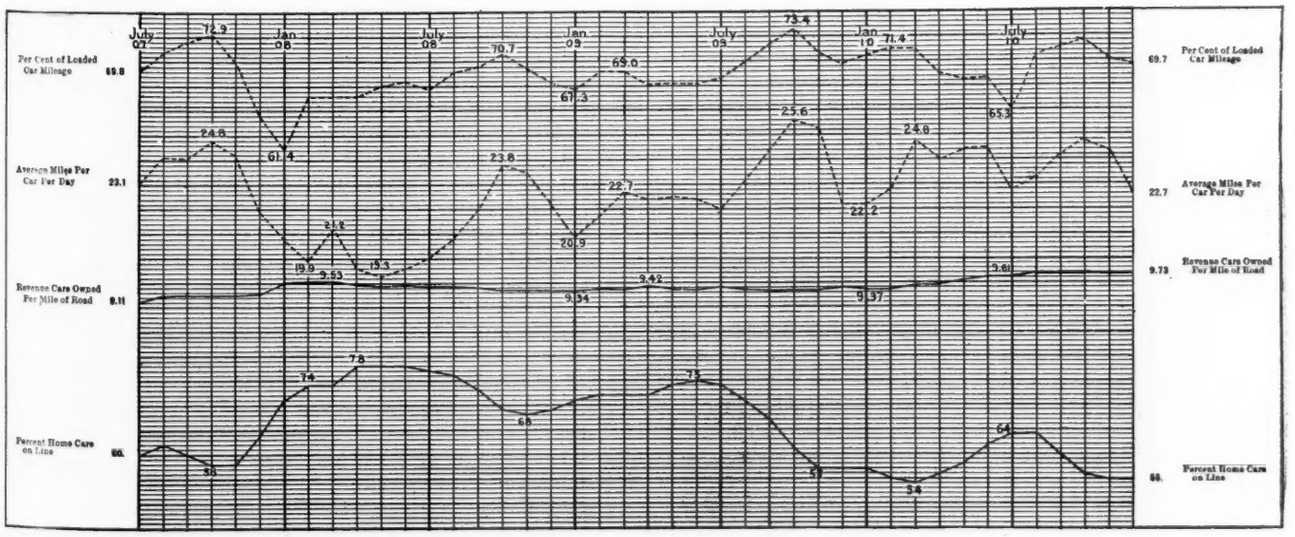
The accompanying table gives car balance and performance figures by groups for December, and the charts show car earnings and performance in 1907 to 1910 inclusive.

Mail Route on Atchison, Topeka & Santa Fe.

The Atchison, Topeka & Santa Fe has consented to resume its connection with the Missouri Pacific at Kansas City for mail traffic. A short time ago the Santa Fe put on a fast mail train from Chicago which was scheduled to reach Kansas City at 1 a. m., in an effort to induce the post office department to send eastern mail for Kansas through Chicago and over its line, rather than via St. Louis over the Pennsylvania and the Missouri Pacific. This situation was met by the Missouri Pacific when it put on a fast mail train from St. Louis which reached the Union station in Kansas City simultaneously with the Santa Fe train. Then the Santa Fe changed the route of its eastern mail through Kansas City from the Union station to the Grand avenue station, under which arrangement the Missouri Pacific could not make connections with it. If the Santa Fe had continued to route the mail in this way the Post Office department would have found it necessary to route eastern mail via Chicago and the Santa Fe, as that would have been the shortest route for mail from the east destined to points beyond Kansas City on the Santa Fe. Under the arrangement made by the Santa Fe (under pressure from the Post Office department) its train No. 15 will reach the Union station in Kansas City at 1:45 a. m. and leave 15 minutes later.



Car Earnings and Car Loading.



Car Balance and Performance.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF FEBRUARY, 1911. (SEE ALSO ISSUE APRIL 14.)

Name of road.	Mileage operated at end of period.	Operating revenues: Freight.	Passenger.	Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
Buffalo, Rochester & Pittsburgh	572	$558,975	$67,181	$644,341	$42,549	$120,255	$10,041	$230,487	$14,003	$417,335	$227,006	—$29	$16,000	$210,977	—$21,734
Central of Georgia	1,915	796,834	235,089	1,119,929	129,771	188,107	32,771	371,842	34,940	757,431	362,497	5,286	42,544	325,239	52,593
Chicago & Eastern Illinois	965	704,438	156,867	932,086	83,963	133,313	22,885	374,099	33,473	647,733	284,353	—1,286	28,500	254,567	36,424
Chicago Great Western	1,495	694,900	185,628	957,877	92,473	166,262	43,913	435,091	35,373	773,112	184,765	—571	32,823	151,371	27,438
Chicago, Indianapolis & Louisville	617	282,707	105,592	433,564	59,077	62,401	15,477	173,112	15,257	325,324	108,240	.....	22,500	85,740	—8,227
Cincinnati, Hamilton & Dayton	1,014*	475,080	102,323	649,697	73,768	136,226	23,477	339,727	22,108	595,306	54,391	.....	32,576	21,815	—57,216
Colorado & Southern	1,173†	441,186	85,122	571,150	55,717	124,292	10,828	203,440	21,903	416,180	154,970	—1,530	24,700	128,740	—121,978
Denver & Rio Grande	2,542‡	1,095,228	277,482	1,445,736	107,554	318,047	46,517	569,019	50,313	1,091,450	354,286	—8,025	73,000	273,261	—98,824
El Paso & Southwestern Co	901§	453,543	82,312	567,110	64,440	73,665	11,624	179,156	22,567	351,452	215,658	—852	20,076	194,730	23,454
Elgin, Joliet & Eastern	831¶	497,474	7	524,652	53,868	125,419	3,932	194,996	13,994	392,209	132,443	.....	18,400	114,043	—92,315
Florida East Coast	583	198,542	239,464	499,211	39,046	55,910	12,114	142,285	7,228	256,583	242,628	.....	15,500	227,128	57,802
Galveston, Harrisburg & San Antonio	1,338	546,788	252,243	846,321	114,648	107,307	34,391	342,404	28,944	627,694	218,627	—1,683	30,072	186,872	40,000
Gulf, Colorado & Santa Fe	1,518	590,053	199,324	871,556	177,575	156,843	23,148	389,641	36,081	783,288	88,268	.....	33,307	54,961	71,127
Illinois Central	4,574‖	3,088,681	1,013,839	4,712,238	466,545	945,850	107,651	1,780,495	116,170	3,416,711	1,295,527	1,586	241,524	1,055,589	63,679
International & Great Northern	1,159	455,613	152,753	652,968	109,636	106,545	19,498	341,803	23,243	600,725	52,243	—295	22,000	29,948	—11,638
Iowa Central	559	220,805	36,977	269,679	31,149	41,002	7,159	127,519	8,514	215,343	54,336	.....	9,735	44,601	11,858
Kansas City Southern	827	542,527	115,230	739,846	70,329	113,334	27,060	268,924	34,592	514,239	225,607	.....	27,399	198,208	—34,378
Lake Erie & Western	886	309,504	54,408	386,494	68,796	77,885	13,357	172,377	13,350	345,765	40,729	.....	18,000	22,729	—82,454
Maine Central	932	436,508	156,463	633,066	74,395	123,025	7,174	289,362	23,313	517,269	115,797	—2,223	38,280	75,294	—62,465
Minneapolis & St. Louis	1,027	258,998	77,097	359,932	34,626	53,411	11,051	176,344	13,479	288,911	71,021	—29	16,861	54,131	28,346
Missouri, Kansas & Texas	1,737a	909,853	370,529	1,377,475	148,604	222,571	40,517	467,380	45,770	924,842	452,633	1,114	58,515	395,232	—
Missouri, Kansas & Texas of Texas	1,348	457,192	267,858	781,352	115,401	71,440	23,783	442,501	33,752	686,877	94,475	784	22,500	72,759	78,026
Mobile & Ohio	1,114	613,020	106,749	841,648	98,119	162,582	33,430	309,584	40,823	644,538	197,110	—768	25,460	170,882	—18,307
Nashville, Chattanooga & St. Louis	1,230	754,758	210,189	1,032,685	152,782	183,480	32,019	361,216	24,795	754,292	278,393	131	25,278	253,246	—18,368
New York, Chicago & St. Louis	562	715,183	83,200	827,264	73,856	126,617	46,339	402,662	16,906	666,380	160,884	—1,739	29,600	129,545	—62,280
New York, Ontario & Western	546	515,859	67,320	604,552	68,569	111,740	10,208	290,636	15,876	497,029	107,523	—4,633	17,500	85,390	12,323
Philadelphia & Reading	1,022	2,473,290	484,264	3,099,214	215,770	634,446	34,971	1,110,174	60,139	2,055,500	1,043,714	34,772	84,866	993,620	—297,626
St. Louis Southwestern	797b	507,878	100,820	637,750	75,392	93,210	24,040	157,696	23,252	373,590	264,160	—393	21,575	242,192	55,085
St. Louis Southwestern of Texas	703	218,281	60,670	298,329	100,220	75,506	10,489	159,529	18,442	364,186	—65,857	—202	10,000	—76,059	—17,513
San Pedro, Los Angeles & Salt Lake	1,105c	342,508	196,118	576,754	109,100	122,150	33,362	259,911	18,195	542,718	34,036	—5,381	26,695	1,960	29,708
Seaboard Air Line	3,046d	1,381,171	404,397	1,965,195	234,521	253,047	57,755	648,654	51,920	1,245,897	719,298	—2,448	70,000	646,850	72,163
Southern Pacific Co	6,187e	3,583,350	2,400,159	6,493,027	813,396	914,125	144,592	1,974,421	226,569	4,073,103	2,419,924	—54,697	283,654	2,081,573	—426,032
Texas & Pacific	1,885	802,811	288,666	1,159,412	143,613	271,648	26,356	565,095	38,138	1,044,850	114,562	8,535	38,403	84,694	—110,882
Vandalia	827	490,833	177,828	751,616	80,764	155,562	29,032	336,705	18,547	620,610	131,006	.....	26,791	104,215	—10,729
Wabash	2,515	1,457,063	460,347	2,091,078	190,904	381,544	69,425	1,013,761	68,301	1,723,935	367,143	—2,564	76,948	287,631	—215,491
Yazoo & Missisippi Valley	1,372	631,960	217,467	910,243	118,530	109,958	15,054	304,069	24,578	572,189	338,054	—154	36,053	301,847	151,785
EIGHT MONTHS OF FISCAL YEAR 1911.															
Buffalo, Rochester & Pittsburgh	572	$5,319,941	$735,918	$6,289,241	$610,074	$1,151,878	$90,624	$2,004,227	$106,741	$3,963,544	$2,325,697	$635	$128,000	$2,198,332	—$26,078
Central of Georgia	1,915	5,832,197	2,390,406	8,989,184	1,202,130	1,440,262	261,260	2,823,899	327,007	6,054,558	2,934,626	51,730	366,488	2,619,868	92,693
Chicago & Eastern Illinois	965	6,604,106	1,454,397	8,581,795	817,435	1,483,027	190,415	3,133,430	265,174	5,889,481	2,692,314	—10,934	224,129	2,457,251	72,756
Chicago Great Western	1,495	5,902,748	1,949,595	8,492,102	938,463	1,283,941	372,980	3,428,975	284,523	6,308,882	2,183,220	1,848	262,581	1,922,487	—
Chicago, Indianapolis & Louisville	617	2,675,348	1,052,686	4,084,891	532,924	578,943	132,133	1,464,742	117,638	2,826,380	1,258,511	.....	180,000	1,078,511	—124,404
Cincinnati, Hamilton & Dayton	1,014*	4,590,964	1,161,764	6,411,100	508,075	1,129,590	194,148	2,960,214	175,193	4,967,220	1,443,880	.....	243,716	1,200,164	—118,834
Colorado & Southern	1,173†	5,077,345	1,101,036	6,525,435	754,459	1,253,652	93,767	2,060,764	177,440	4,340,082	2,185,353	—11,184	197,600	1,976,569	—177,011
Denver & Rio Grande	2,542‡	11,858,851	3,543,113	16,109,839	1,848,994	2,785,380	382,271	5,515,244	395,010	10,926,899	5,182,940	—22,484	566,000	4,594,456	166,846
El Paso & Southwestern Co	901§	3,971,033	649,269	4,858,447	614,166	643,722	85,641	1,388,295	181,362	2,913,186	1,945,261	—9,450	149,251	1,786,560	82,267
Elgin, Joliet & Eastern	831¶	5,043,941	58	5,341,196	701,802	1,117,214	32,357	1,724,031	138,409	3,713,813	1,627,383	.....	126,200	1,501,183	—712,888
Florida East Coast	583	1,148,727	853,738	2,284,964	344,217	352,729	51,568	795,411	62,301	1,606,226	678,738	.....	111,641	567,097	158,939
Galveston, Harrisburg & San Antonio	1,338	5,234,807	1,865,892	7,477,442	964,955	1,120,315	219,727	2,741,732	226,405	5,273,135	2,204,307	—21,550	240,818	1,941,939	74,124
Gulf, Colorado & Santa Fe	1,518	5,954,582	2,156,866	8,678,064	1,507,105	1,270,392	194,868	3,277,071	259,003	6,508,439	2,169,626	.....	263,652	1,905,974	334,848
Illinois Central	4,574‖	27,653,116	8,902,577	41,456,268	5,015,914	8,307,086	896,125	14,165,850	854,010	29,238,985	12,217,283	—24,646	1,730,347	10,462,290	2,461,027
International & Great Northern	1,159	4,554,934	1,455,692	6,410,659	927,171	917,182	157,837	2,629,857	173,770	4,805,817	1,604,842	—2,881	174,000	1,427,961	355,201
Iowa Central	559	1,881,780	381,707	2,367,794	279,583	404,252	57,131	991,308	70,191	1,802,465	565,329	.....	78,351	486,978	13,328
Kansas City Southern	827	5,051,658	1,128,246	6,874,591	690,124	896,715	214,105	2,320,359	243,211	4,364,514	2,510,077	.....	230,641	2,279,436	357,689
Lake Erie & Western	886	2,943,327	632,265	3,779,548	614,081	705,445	125,758	1,455,260	99,065	2,999,609	779,939	.....	149,762	630,177	—344,953
Maine Central	932	3,590,389	2,063,621	6,032,203	978,792	887,910	59,678	2,314,212	204,739	4,445,331	1,586,872	13,086	292,167	1,307,791	—431,905
Minnetpolis & St. Louis	1,027	2,463,812	848,328	3,541,859	380,223	454,623	88,638	1,415,817	122,445	2,461,746	1,080,113	—268	158,585	921,260	1,838
Missouri, Kansas & Texas	1,737a	7,935,913	3,318,993	11,991,132	1,562,842	1,681,316	297,872	3,998,607	351,394	7,892,030	4,099,102	802	463,583	3,636,321	—
Missouri, Kansas & Texas of Texas	1,348	4,757,398	2,585,294	7,793,851	1,106,169	535,839	183,895	3,570,876	284,273	5,681,052	2,112,799	—5,599	179,602	1,927,598	450,296
Mobile & Ohio	1,114	5,330,160	988,305	7,342,146	857,367	1,279,349	262,882	2,530,513	271,824	5,201,935	2,140,211	—11,850	200,080	1,928,281	17,746
Nashville, Chattanooga & St. Louis	1,230	5,685,005	1,953,243	8,148,605	1,196,359	1,531,363	277,950	2,885,851	197,478	6,089,001	2,059,604	—4,425	181,287	1,873,892	—79,250
New York, Chicago & St. Louis	562	6,173,474	1,062,670	7,507,626	832,409	988,226	399,874	3,125,241	129,046	5,474,796	2,032,830	—12,899	246,520	1,773,411	—629,805
New York, Ontario & Western	546	4,824,589	1,201,047	6,263,794	741,820	970,595	92,881	2,446,444	140,103	4,391,843	1,871,951	—34,824	140,000	1,697,127	191,344
Philadelphia & Reading	1,022	23,113,611	4,742,425	29,142,078	2,468,615	5,418,404	345,192	9,463,667	527,821	18,223,699	10,918,379	129,424	673,886	10,373,917	—620,412
St. Louis Southwestern	797b	4,217,542	970,288	5,421,661	578,899	834,719	215,108	1,337,679	180,022	3,146,427	2,275,234	—5,682	158,515	2,111,037	128,057
St. Louis Southwestern of Texas	703	2,132,036	720,715	3,027,197	742,566	584,370	85,233	1,305,579	135,536	2,853,284	173,913	—1,732	75,726	96,455	64,095
San Pedro, Los Angeles & Salt Lake	1,105c	3,196,716	1,806,471	5,337,825	964,295	855,861	251,009	1,981,036	137,666	4,189,867	1,147,958	—40,055	214,086	893,817	—79,557
Seaboard Air Line	3,046d	9,541,596	3,125,783	14,106,609	1,902,886	1,905,843	487,534	4,766,387	399,412	9,462,062	4,644,547	—9,409	530,000	4,105,138	165,328
Southern Pacific Co	6,187e	36,301,747	21,501,952	62,002,260	7,580,523	7,921,909	1,313,455	16,717,912	1,830,481	35,364,280	26,637,980	195,728	2,217,632	24,616,076	—2,824,312
Texas & Pacific	1,885	7,762,433	2,848,229	11,427,204	1,270,490	2,107,010	172,682	4,546,764	291,979	8,388,925	3,038,279	—4,430	420,626	2,613,223	—497,478
Vandalia	827	4,851,521	1,657,700	7,228,586	929,447	1,322,599	225,647	2,897,267	158,121	5,533,081	1,695,505	.....	223,051	1,472,454	—125,203
Wabash	2,515	13,716,380	5,135,646	20,329,843	2,239,993	3,209,346	620,152	7,995,379	584,618	14,649,488	5,680,355	—13,403	604,250	5,062,702	—535,495
Yazoo & Mississipp Valley	1,372	5,200,693	1,934,225	7,586,441	1,337,840	1,051,726	119,939	2,314,441	188,871	5,012,817	2,573,624	—3,659	270,048	2,299,917	955,080

Mileage operated on February 28, 1910.—* 1,036 miles; † 1,249 miles; ‡ 2,505 miles; § 867 miles; ¶ 781 miles; ‖ 4,551 miles; *a* 1,724 miles; *b* 773 miles; *c* 979 miles; *d* 2,995 miles; *e* 6,067 miles; — indicates Deficits, Losses and Decreases.

Dr. Seaman A. Knapp.

The death of Dr. Seaman A. Knapp, of the United States Agricultural Department, which occurred in Washington, D. C., on April 1, has been a great loss to the farmers of the United States and especially to those of the southern states.

Dr. Knapp understood thoroughly the agricultural problems of the South, and, as the official in charge of the farmers' co-operative demonstration work of the department, it may be said, comprehensively speaking, that he did more than any other one man in our time to bring about the adoption of improved agricultural methods in the South.

When the Mexican cotton boll weevil began to spread over the fields of Texas and there were predictions that it would render cotton production unprofitable in all of the territory to which it might spread, Dr. Knapp solved the problem of maintaining cotton production in spite of the presence of that insect. Dr. Knapp was an apostle of good farming in every department. He taught the value of fall plowing with deep breaking of the ground, of growing winter cover crops, and of building up soil fertility by the proper rotation of crops and by the intelligent use of manures and commercial fertilizers. He believed in growing live stock, at least to the extent of utilizing all the waste products and idle lands of the farm, and in producing on each farm, as far as possible, all of the foods required by the men and animals on the farm.

One feature of Dr. Knapp's work which I believe to be of inestimable value to the South was his organization of Boys' Corn Clubs. While the immediate purpose of these clubs is the growing of corn, they are performing a much more valuable work for the South in the growing of farmers. Their full value to our section will be realized when Dr. Knapp's Corn Club boys, as grown-up farmers, apply the same methods of intensive farming to other crops and to entire farms that they have used in making record yields of corn on single acres. While doing so much for the boys of the South, Dr. Knapp did not neglect the girls, and the organization of a Girls' Tomato Club at Aiken, S. C., last season marked the beginning of a work which has been greatly enlarged for this season and which, at the time of his death, he was preparing still further to expand.

I feel sure that I voice the sentiments of the farmers of the South and of all the southern people in expressing the opinion that Dr. Seaman A. Knapp was one of the most useful citizens of the United States in his generation, and that, in his death, our whole section has suffered a great loss.—*W. W. Finley* in a letter to the Farmers of the South.

INTERSTATE COMMERCE COMMISSION.

The commission has suspended, until August 10, tariffs presented by the Pennsylvania Railroad, providing for an increase of 15 cents a ton on buckwheat anthracite coal, also to Watkins, N. Y., and to other eastern destinations.

The commission has suspended from May 15 to September 12, proposed advances in coal rates from West Virginia to Lake Erie ports over the Kanawha & Michigan. Similar suspensions were ordered sometime ago in connection with rates proposed by other lines in the same territory.

Reparation Awarded.

William K. Noble v. Jonesboro, Lake City & Eastern et al. Opinion by Commissioner Meyer.

The defendant should have observed the routing specified in the bill of lading. (20 I. C. C., 500.)

Crescent Coal & Mining Company v. Baltimore & Ohio et al. Opinion by Commissioner Clark:

Tariffs of carrier performing the road haul name rates to Chicago, which include delivery on tracks of other carriers in the Chicago switching district, and provide that shipper or consignee shall have 24 hours free time after arrival within which, without further charge, to reconsign to such deliveries on tracks of other carriers. A carrier that is party to the tariffs containing the reciprocal switching arrangements declines to accept cars for such deliveries except at its convenience. Consignee gives reconsignment to the carrying road within the time provided in its tariff. The delivering road delays acceptance of such shipments and the carrying road thereupon assesses demurrage against the consignee. The consignee, having given his reconsignment order and requested delivery of shipment, is powerless to do anything except await the action of the carriers. If defendants' tariffs provide something that it is impossible for them to perform, something that they may not be reasonably required to perform, their recourse is not in the assessment against the shippers or consignees of additional charges growing out of causes in the creation of which neither shipper nor consignee has any part and over which neither of them has any control.

Complaint Dismissed.

Charles Goldenberg v. Clyde Steamship Co. Opinion by the Commission.

On the facts disclosed by the record it is held that defendant's action in connection with the storage of the property in question was not unreasonable and that complainant is not entitled to reparation; but that defendant has failed to comply with the law because it has not filed with the commission a tariff stating definitely the storage privileges and charges applicable to shipments over its line which move partly by railroad and partly by water under a common arrangement for a continuous shipment. (20 I. C. C., 527.)

International Salt Co., of Illinois, complainant, and Morton Salt Co., intervener, v. Genesee & Wyoming et al., defendants, and Detroit Salt Co., and Sterling Salt Co., interveners. Opinion by Commissioner Harlan.

On complaint that a carload rate of 10 cents per 100 lbs. in effect for several years on coarse salt in bulk from Retsof, and certain other originating points in New York, to Chicago, is a normal and reasonable rate between those points and ought therefore to be scaled to intermediate points in Central Freight Association territory in accordance with the percentage system of rates. It is held that the record shows that the rate is compelled by competitive conditions that do not exist at intermediate points. The complaint is dismissed. (20 I. C. C., 530.)

Big Cañon Ranch Co., and Corder & Co., intervener, v. Galveston, Harrisburg & San Antonio Co. et al. Opinion by Commission.

Complainant alleges that the charges exacted by defendants for transportation of certain carloads of sheep from Dryden and Sanderson, Tex., to Soldani, Okla., were unreasonable. It appears that the shipments moved from points of origin to Fort Worth, Tex., where freight charges were paid, and delivery made to the shipper's agent, who thereupon took out new bills of lading for the movement to Soldani. The movement to Fort Worth was intrastate and therefore not subject to the jurisdiction of the commission, and the charges for the interstate movement beyond Fort Worth do not appear to have been unreasonable. (20 I. C. C., 523.)

Failure to Show Damage.

International Salt Co., of Illinois, complainant, and Morton Salt Co., Intervener, v. Pennsylvania Railroad et al. Opinion by Commissioner Harlan.

Reparation on shipments of coarse salt in bulk from Retsof, N. Y., to Detroit, under a rate of 11 cents, subsequently reduced to 7.8 cents under an order by this Commission finding the former rate to be discriminatory, denied on the ground that the complainant has not shown that it was damaged, all competing shippers to Detroit from the same salt field having paid the same rate. (20 I. C. C., 539.)

Refund Allowed on Lost Commutation Ticket.

William E. Moore v. New York & Long Branch Railroad Company. Opinion by the commission:

Complainant is a resident of Philadelphia, Pa. His petition herein, filed December 12, 1910, puts in issue the lawfulness of defendant's regulation governing return of purchase price of commutation tickets which have been lost by the owner.

Complainant bought 50-trip season ticket, between North Asbury Park, N. J., and New York. The ticket was used for one trip from North Asbury Park to New York, then lost and never

recovered. Defendant was notified of the loss and orders were issued directing conductors to refuse to honor any of the coupons from the ticket, and there is no evidence that they were ever presented by anyone for passage. Demand for refund was made by complainant at the expiration of the time limit of the ticket and apparently proof of ownership and identity was satisfactory since an offer of repayment was made by defendant, provided an order of the commission to that effect could be obtained.

The form of the ticket is such that defendant can readily protect itself against fraudulent use thereof. The purchaser's name appears on the inside cover of the book and on the coupon which is surrendered for the first trip. On each of the coupons is stamped the number of the book. Therefore, even if conductors should accept coupons from a person other than the purchaser, that fact can be ascertained at expiration of the time limit by defendant's accounting department. Complainant appears to have complied with all the conditions except that relating to recovery of the lost ticket.

Without at this time attempting to determine the many questions which are pending respecting the extent of our jurisdiction over the commutation fares, or to say what conditions may properly be enforced in connection with the sale of tickets at reduced rates, it seems obvious that carriers may not lawfully attach to the use of commutation tickets conditions which unduly discriminate between the individual purchasers thereof. There are many cases in which recovery of a lost ticket is impossible; and in view of the fact that the carrier is protected against fraudulent use thereof by the form of the ticket, as well as the conditions relating to refund thereon, we see no sound reason for the rule here in question. It is our conclusion that it results in undue discrimination against complainant and others similarly situated and that defendant should be ordered to cease and desist from enforcing it. In the present instance we find that complainant is entitled to refund in an amount equal to the difference between the price paid for the commutation ticket and the one-way fare from North Asbury Park to New York, or $31.35, with interest from October 31, 1910. (20 I. C. C. 557.)

Rates on Grain Left Undisturbed.

Board of Trade of the city of Chicago v. Atlantic City Railroad et al. New York Produce Exchange v. New York Central & Hudson et al. Opinion by Commissioner Prouty:

Both the above complainants attack what are known as ex-lake rates upon grain from Buffalo to eastern points. In the first the complaint is directed against both domestic and export rates, while in the second export rates alone are involved. The two cases were heard together and may be disposed of in a single report.

DOMESTIC RATES.

Grain can move from the western field of production to the eastern point of consumption either by some all-rail route or by what is known as the rail-and-water route. In the latter case it is carried from the point of production to some port upon the Great Lakes, like Chicago or Duluth, by rail, is taken from the western lake port by water to some eastern lake port, of which Buffalo is the principal one, and is thence transported by rail to destination. When grain takes the all-rail route it may pass through Chicago or it may reach its eastern destination without entering that market. If it takes the rail-and-water route, it must move through some lake port, of which Chicago is the largest. It is therefore for the advantage of Chicago that such rates should be maintained as will permit grain to move by the water route. The board of trade of that city, which is an organization having in charge the grain interests of that community, insists that rates are now so constructed as to divert traffic from the water route to the all-rail route and that this results in undue prejudice against that locality.

The position of the complainant will be best understood by an illustration drawn from the rates now in effect. The rate on wheat from Chicago to Boston is, at the present time, 18 cents per 100 lbs. If this grain moves by the New York Central lines it would pass through the city of Buffalo en route and would be transported from Buffalo to Boston by the New York Central & Hudson. For this service that carrier would receive, under the present adjustment of rates, 7.9 cents per 100 lbs., that being its division of the joint through rate after all allowances have been made for terminal expenses, etc. This figure is taken from the brief of the complainant and is sufficiently accurate for the purpose of illustration.

By ex-lake rates are meant those rates which apply upon grain reaching Buffalo from the west by water. The present ex-lake rate on wheat from Buffalo to Boston is 13.3 cents per 100 lbs. This ex-lake rate includes elevation; that is, the taking of the grain from the ship into the elevator and again loading it from the elevator into the car, for which the charge is one-half cent per bushel, or, in case of wheat, 0.83 of 1 cent per 100 lbs. When this absorption is deducted from the ex-lake charge the carrier receives for handling the grain from Buffalo to Boston about 12.5 cents per 100 lbs. The cost of transporting to Boston the wheat which has reached Buffalo by lake is to every practical intent the same as that of transporting the wheat which has come to Buffalo by rail, and the complainant insists that when the New York Central charges for handling the ex-lake wheat 12.5 cents, while it handles the all-rail grain for 7.9 cents, it is guilty of an unjust discrimination against the lake grain, and therefore against the city of Chicago, which is interested in moving the grain by water.

The defendants reply that their ex-lake rate from Buffalo to Boston is reasonable; that the rate from Chicago to Boston is competitive, and that the division which they are willing to accept from Buffalo to Boston as the price of engaging in this competitive business ought not to be used as the standard by which to measure the reasonableness of their ex-lake rate from Buffalo.

As already observed and as fully stated in the *Banner Milling case*, flour ground at Buffalo is almost entirely from wheat received ex-lake at that port. It is difficult to see how this Commission, if it is to maintain the parity of rate between wheat and flour which generally prevails, upon the strength of which mills have been erected at Buffalo and throughout all parts of the United States, and which has been generally approved by this Commission, could enforce or even permit the charging of a rate upon grain from Buffalo materially lower than the rate upon the flour manufactured at Buffalo from that grain. To sustain the contention of the complainants would require us to establish rates on wheat from Buffalo from 3 to 5 cents per 100 lbs. less than the present flour rates. The effect of such a rate adjustment would be not only to injure the mills at Buffalo but to seriously affect those at all western points. While there is very great force in the contention of the complainant, we feel that, upon a view of the entire situation, it can not be accepted. If this rate from Buffalo were unreasonably high, so that the cost of transporting grain or grain products from the western point of origin via the Great Lakes to the eastern point of consumption was unreasonably high, it would be our clear duty to reduce this rate; but where it is practically admitted that the transportation charge is not excessive, and where we are asked to take this action simply because more grain would thereby flow through a particular grain market, we are at liberty, in just consideration of all interests, to decline to interfere with the present arrangement, which is, in the main, satisfactory.

Ex-lake rates were in fact for many years lower than corresponding local rates from Buffalo, and the complainants point to this as the most conclusive evidence that the maintenance of lower ex-lake rates today would not break down the rate structure. But it must be remembered that until about the time when these rates became substantially what they now are the published tariff was not observed, and that this was especially true of highly competitive business, like grain and grain products, where the rate was of vital importance.

It should also be noted that Buffalo millers have always insisted that the charging of a lower rate upon ex-lake wheat than upon the flour ground from that wheat was a discrimination against Buffalo. Now that published rates are actually observed, and that the margin of profit tends to decrease rather than increase, we can not assume that any locality can grind flour under a permanent rate disability. To make the rate on ex-lake wheat to New York City materially lower than the rate on flour from Buffalo would inevitably throw the grinding of flour consumed in the city of New York and that vicinity to the seaboard.

EXPORT RATES.

The New York Produce Exchange asks a rate of 4 cents per bushel on export grain and defendant's refuse to grant it.

The real reason why these defendants decline to accede to the request of the New York interests for the 4-cent export rate seems to be the fear upon their part that the result of complying with that request would be to disorganize the general rate structure upon grain and grain products from the west to Atlantic seaboard territory.

In 1908 the defendants, upon the insistent request of the New York grain interests, did establish and maintain, for 57 days, an export rate of 4 cents per bushel. This rate was withdrawn because the defendants believed that its continuance would result in a reduction of the rates from the west upon grain and grain products. During the season of 1910 a rate of 4 cents was applied to the movement of Canadian grain in bond, but the defendants are satisfied that no distinction can be maintained between Canadian and American wheat and, therefore, upon a view of the entire situation, have declined to restore the 4-cent rate.

The difference between the domestic and export rate from Chicago at the present time is 3 cents per 100 pounds. The difference between the export and the domestic rates, ex-lake, at the present time is 1 cent per bushel, or six-tenths of a cent per 100 lbs. It will be seen, therefore, that the difference in export rates where the wheat moves by the Great Lakes from Chicago is much less than the difference where it moves all rail. At 4 cents per bushel the difference would still be in favor of the all-rail route.

American millers insist that to make a rate of 4 cents on wheat without a corresponding rate upon the product of wheat is to discriminate against the home miller in favor of his foreign competitor. It can not be denied that the result of making a lower transportation charge on the wheat than upon the flour to foreign destinations does operate in favor of the foreign miller, but it must also be recognized that the cost of transporting wheat by water is less than the cost of transporting flour by water, and that wheat will move to the foreign consumer in the form of wheat cheaper than it can be moved in the form of flour, unless the Government sees fit to make an arbitrary rule that whatever carrier transports wheat at a certain price shall carry flour at the same price, which is not suggested. This wheat will move abroad through the port of Montreal if it does not move through the port of New York, and it is doubtful whether the claim of the miller and of the western railroad that the effect of this 4-cent ex-lake export rate would be discriminatory toward them is well taken. It would not materially increase the amount of wheat which will be exported; it would simply determine whether that wheat should flow through an American or a Canadian port of export.

We are inclined to think that, under all the circumstances, these carriers might well establish, during the period of navigation, a 4-cent ex-lake export rate upon wheat and corresponding rates upon other grain, but the rate itself is so low, the margin over and above the cost of operation is so narrow, that we do not feel warranted in making this requirement. Whether it shall be established is a matter of policy which must be left to the carriers themselves, and not a matter of right which may be demanded by the port of New York. When the improvements in progress upon the Erie Canal are completed that waterway will undoubtedly determine the rate at which grain shall be carried from Buffalo to tidewater. (20 I. C. C., 504.)

STATE COMMISSIONS.

The lower house of the Colorado legislature has passed a bill which provides for enlargement of the powers of the state railway commission, including the power to make and enforce rates.

The California State Commission has granted the railways an extension of 60 days from April 10, the final day according to new law, in which to file intrastate tariffs in conformity with the long-and-short-haul clause of the state constitution.

The State Railroad Commission of California has refused to approve the tariffs filed with it by Wells, Fargo & Company's express and the company has been ordered to appear before the commission on May 9 and justify the charges. If the company is not able to explain to the satisfaction of the commission, this body will fix the rates.

The Manitowoc & Northern Traction Company petitioned the Railroad Commission of Wisconsin for authority to increase the passenger rate of 10 cents between the cities of Manitowoc and Two Rivers to 15 cents, an amount in excess of the maximum provided in the franchise, and for an order putting in effect such increased rate as an emergency rate, pending the hearing and decision on the application. The case was taken to the courts in proceedings for an injunction. The circuit court held that the existing rate of 10 cents was unreasonable and the proposed rate of 15 cents reasonable. The supreme court held that the commission has power, in proper proceedings, to increase the rate beyond the maximum provided in the franchise. It is apparent that if the franchise rates are restored, it will result in such a diminution of the petitioner's revenue as to jeopardize the public service. Petitioner is therefore authorized to maintain its present rate of 15 cents until further order of the commission. (6 W. R. C. R. 395.)

The Railroad Commission of Wisconsin has held that the rates for petroleum products should not exceed the rate of charge for articles that come in class four of the western classification. The National Refining Company alleged that the less than carload rates on certain classes of petroleum products from La Crosse and Milwaukee to Wisconsin points are unjust and unreasonable, in that the respondents exact the third class rate instead of the fourth class rate or less, which the petitioners deem reasonable. It appeared from the testimony that the carload rate paid by the Standard Oil Company from Whiting, Ind., its shipping point, to Wisconsin points, distances about 70 miles greater than those covered by shipments from Milwaukee to the same points, is about equal to the fifth class rate from Milwaukee, somewhat lower than the fourth class rate and about half of the third class rates now in effect; that the Wisconsin rates are higher than the rates in other states where similar commercial conditions prevail, and higher than the rates on similar commodities. The railway companies which are involved were ordered to discontinue the present classification and rates.

In the case of the Wisconsin Pulp and Paper Manufacturers v. Chicago & North Western et al the Railroad Commission of Wisconsin holds that carriers are ordinarily entitled to rates that will yield sufficient revenue to cover operating expenses, including a reasonable amount for interest and profit; that no rates should be so low that they do not cover their fair share of operating expenses, including something in the way of net earnings; that the earnings per unit of profit should be lower for low grade than for high grade articles; that the relation which the rates on the various classes of freight ought to bear to each other, largely depends upon such factors as the value of the articles, their bulk in proportion to their weight, the risk involved, the magnitude and regularity of the traffic. The petition in this case alleges unreasonable rates for the transportation of coal from the Lake Michigan ports in Wisconsin to various points in the Fox River Valley and the Wisconsin River Valley districts. The rates at present in effect are uniform to the different points in each of the above named districts, regardless of the distance of such receiving points from the respective shipping points. The petitioners contend that if the railways wish to continue group rates, made to apply from all lake ports equally, they should be based upon the shortest haul instead of on the longest, as it is alleged is now the case; or, if the railways prefer, that the rates from the different lake ports should be based upon the average distance from each port into the two manufacturing groups involved, without any attempt to put the ports on an equal footing. Many comparisons were made between the rates complained of and the rates in neighboring states where similar conditions prevail, and also with the rates in the paper mill districts in the New England states. Some evidence was also introduced relative to the cost to the carrier of the services involved. The commission says in the instant case the present grouping should be preserved, and that the rate on coal from the lake ports to the two mill groups should be based on the average distance from these ports to some point in the center of each of these mill groups; that under the facts disclosed herein, no reduction in the rate to the Wisconsin river mills can be made at this time; that the rate to the Fox river mills should be reduced from 75 cents to 65 cents per ton. (6 W. R. C. R. 436.)

COURT NEWS.

The Commerce Court last week announced, in connection with the case of Proctor & Gamble, and others, that it would take jurisdiction of cases relating to interstate commerce which had been dismissed by the Interstate Commerce Commission on account of lack of jurisdiction.

In suit now before the Commerce Court, the attorney of the Goodrich Transit Co., operating a line of boats on the Great Lakes, has attacked the power of the Interstate Commerce Commission to prescribe rules for accounting for a company, the great part of whose business is intrastate and only a very small part interstate.

The Supreme Court of the United States has restored to its docket for reargument the case involving the constitutionality of the laws of Missouri limiting passenger fares to two cents and limiting certain freight rates. The cases involving the constitutionality of the two-cent passenger fare law of West Virginia is to be argued on the 10th of next October.

The Supreme Court of Iowa has decided in favor of the Iowa Railway Commission and against the Chicago, Milwaukee & St. Paul in what is known as the Clark Coal Company case. The coal company had been shipping coal from its fields in Illinois into Iowa, paying the interstate rate to Dubuque, Iowa, and then reconsigning the same cars out over the St. Paul and other roads to different points in Iowa, for which latter service it paid the state rate. When the St. Paul refused to accept the shipments unless the coal was transferred into its own cars, the railway commission issued an order requiring it to do so. The case was then brought before the district court, which upheld the commission, and the Supreme Court has now affirmed the decree of the lower court.

Imprisonment for Bill-of-Lading Frauds.

In the United States District Court at Aberdeen, Miss., April 13, J. H. Miller was sentenced to seven years in prison and to pay a fine of $11,000 for fraudulent use of the mails; and L. C. Steele and C. H. G. Linde, members of the same firm with Miller, were sentenced to two years imprisonment and a fine of $10,000 each. These suits were based on cotton bill frauds, accounts of which made such a sensation last autumn, when it was found that banks and manufacturers in England had suffered losses, aggregating millions of dollars, by accepting bills-of-lading, purporting to represent cotton which had been shipped in Alabama and other southern states, but which had been procured from railway freight agents without the delivery of the cotton. In connection with the present convictions, the New York *Journal of Commerce* says:

The cotton men of the South are much pleased with the outcome of the Steele-Miller trial. A telegram is quoted saying that "the entire South feels that the stain on its commercial affairs has been removed." New York cotton men and bankers believe that the conviction will deter other shippers from negotiating fraudulent documents. The opinion was expressed that the members of the Knight-Yancey firm ought to be dealt with in the same way and receive severe punishment. The long delay in bringing the southern cotton men to justice has created a bad feeling abroad, where it is believed in some quarters that the American government has been rather lax because the sufferers from the frauds were not American citizens.

The East Malay States Trunk Line northward from Gemas is the proposed line which will ultimately connect with the proposed Peninsular Railway from Bangkok, Siam, provided for in the recent Anglo-Siamese treaty. The first section is 76 miles in length connecting Gemas with Kuala Semantan. The survey of this section was commenced in March 1906, and completed in April, 1907. Sanction of construction was given in July, 1907. On this section there are 338 bridges and the line deviates at the 62nd mile to avoid danger from the flood water of the Pahang river. In December the earthwork on this section was reported completed to the Kuala Semantan end and the rail head was within nine miles of that point.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

B. F. Bush, president of the Western Maryland, has been elected president of the Missouri Pacific. See an account of Mr. Bush's railway life elsewhere in this issue.

C. C. Green, acting secretary of the Central of Georgia, at Atlanta, Ga., has been appointed assistant secretary of the Illinois Central and the Central of Georgia, with office at Chicago.

Edward J. White, an attorney at Aurora, Mo., has been appointed assistant to the general solicitor of the Missouri Pacific-Iron Mountain system, with office at Kansas City, Mo., succeeding Elijah Robinson, resigned.

W. H. V. Rosing, mechanical engineer of the Missouri Pacific, at St. Louis, Mo., who was appointed assistant to vice-president and general manager of the St. Louis & San Francisco on April 1, has been appointed assistant to Vice-President Nixon, effective May 1, in special charge of mechanical matters. B. T. Wood, chief clerk in the office of B. L. Winchell, president, at St. Louis, has also been appointed an assistant to Mr. Nixon, in charge of office business relating to operation, maintenance and other matters not assigned to Mr. Rosing.

R. E. Powers, secretary and treasurer of the Gulf & Ship Island, at Buffalo, N. Y., has been elected senior vice-president and treasurer, with office at Buffalo. W. T. Stewart, general superintendent, at Gulfport, Miss., has been elected vice-president and general manager, with office at Gulfport. D. H. Jack has been appointed general counsel, with office at Bradford, Pa. B. E. Eaton has been appointed general attorney, and J. C. Simpson has been appointed secretary, both with offices at Gulfport, Miss. K. B. Hazzard has been appointed assistant secretary, with office at Buffalo, N. Y.

Alexander Simpson Greig, vice-president and general purchasing agent of the St. Louis & San Francisco, with offices at St. Louis, Mo., has been appointed also assistant to the president.

A. S. Greig.

Mr. Greig was born October 25, 1861, in Aberdeen, Scotland, and he received a common school education in that country. He began railway work in 1883 as secretary to the purchasing agent of the Denver & Rio Grande. Three years later he was appointed secretary to the superintendent of machinery and in 1889 became chief clerk to the general superintendent. He was appointed trainmaster of the Santa Fe, Prescott & Phoenix in 1896, and in less than two years was made general superintendent and traffic manager of the El Paso Northeastern and the El Paso Southwestern, where he remained until 1903, and during these five years had charge of the construction of nearly 500 miles of road. In January, 1904, he was made clerk to B. L. Winchell, then president of the Chicago, Rock Island & Pacific, and two years later was appointed assistant to the president of the St. Louis & San Francisco, which office he held until June, 1907. He then went to New York as assistant to B. F. Yoakum, at that time chairman of the executive committee of the Rock Island-Frisco lines, and in December, 1909, when the Rock Island-Frisco merger was dissolved, he was appointed vice-president and general purchasing agent, which office he continues to hold in addition to his duties as assistant to President Winchell.

Operating Officers.

N. E. Ball has been appointed assistant general manager of the Fernwood & Gulf, with office at McComb, Miss.

R. J. Clancy has been appointed assistant to the general manager of the Southern Pacific, with office at San Francisco, Cal.

W. P. Allan, acting commissioner, has been chosen commissioner of the Pacific Northwest Demurrage Bureau, headquarters at Seattle.

W. E. Leonard, superintendent of transportation of the Gulf & Ship Island, has been appointed superintendent, with office at Gulfport, Miss.

C. E. McMullin, who was recently appointed superintendent of terminals of the Northern Pacific at Tacoma, Wash., as was previously announced, will also continue in charge of the Seattle terminal.

William Bryden, trainmaster of the Wabash, Chester & Western at Chester, Ill., has been appointed superintendent, with office at Chester, succeeding Henry Mason, resigned on account of ill health.

D. L. Sommerville, division engineer of the Western division of the New York Central & Hudson River, at Buffalo, N. Y., has been appointed assistant superintendent of the Pennsylvania division, with office at Jersey Shore, Pa., succeeding J. W. Evans, promoted.

George Hodge, superintendent of the Canadian Pacific, at Montreal, Que., has been transferred to Toronto, Ont. A. L. Smith, superintendent at Farnham, Que., succeeds Mr. Hodge, and J. K. McNellie, superintendent at London, Ont., succeeds Mr. Smith.

E. Thomason, general manager of the Durham & Southern, and not the Durham & Charlotte, as previously announced in these columns, having resigned, his position has been abolished and all correspondence should in future be addressed to J. E. Stagg, vice-president, at Durham, N. C.

F. J. Gavin, chief clerk to general superintendent of the Great Northern, at Spokane, Wash., has been appointed a trainmaster of the Kalispeel division, with office at Whitefish, Mont. F. E. Clarity, traveling car agent, has been appointed chief clerk to general superintendent, succeeding Mr. Gavin.

E. S. Cooper, chief train despatcher of the First and Second districts, Eastern division of the Grand Trunk, at Island Pond, Vt., has been transferred to the Fourth and Fifth districts, with office at Bonaventure station, Montreal, Que., succeeding E. S. Waterman, resigned. T. H. Mason succeeds Mr. Cooper.

J. S. Pyeatt, superintendent of the Pere Marquette, at Detroit, Mich., has been appointed superintendent of the River and Cape divisions of the St. Louis & San Francisco, comprising what was formerly known as the Third district, with office at Chaffee, Mo., succeeding J. A. Frates, promoted.

F. I. Cummins, traffic manager and general superintendent of the South Dakota Central at Sioux Falls, S. D., has been appointed assistant general manager, with office at Sioux Falls, a new position. Mr. Cummins will continue in charge of the traffic department and his former office has been abolished.

J. H. Keefe, assistant to the second vice-president and general manager of the Gulf, Colorado & Santa Fe at Galveston, Tex., has been appointed assistant general manager, with office at Galveston, a new position, and his former title has been abolished. In addition to his former duties he will have direct charge of transportation matters pertaining to export, import and coastwise traffic.

J. W. Evans, whose appointment as superintendent of the Ontario division of the New York Central & Hudson River, at Oswego, N. Y., has been announced in these columns, was born October 25, 1864, at Remsen, N. Y. He began railway work in May, 1884, on the Utica & Black River, and until October, 1895, he was consecutively operator, despatcher and chief despatcher of the Utica & Black River, the Rome, Watertown & Ogdensburg, and their successor, the New York Central & Hudson River. He resigned in 1905 to become trainmaster of the Choctaw, Oklahoma & Gulf, now a part of the Chicago, Rock Island & Pacific, at South McAlester, Okla., remaining with that company until January, 1900, when he went to the Atlanta & West Point, with office at Montgomery, Ala. In October, of the same year he returned to the service of the New York Central & Hudson River, as despatcher at Corning, N. Y., and in March, 1903, was promoted to assistant trainmaster at Clearfield, Pa., and in May, 1905, was made trainmaster at Jersey Shore. Mr. Evans was appointed assistant superintendent at Jersey Shore in September, 1907, which position he held at the time of his recent appointment as superintendent of the Ontario division of the same road.

Traffic Officers.

A. J. McDowell has been appointed a traveling dairy agent of the St. Louis & San Francisco, with office at St. Louis, Mo.

J. G. Eads, chief clerk to the assistant general freight agent of the Denver & Rio Grande at Pueblo, Colo., has been appointed a traveling freight and passenger agent, with office at Pueblo.

W. H. Allen, district passenger agent of the Minneapolis, St. Paul & Sault Ste. Marie, at New York, has been promoted to the new position of general eastern passenger agent, with office at New York.

E. E. Wade, chief clerk in the passenger department of the Southern Pacific, has been appointed assistant general passenger agent, with office at San Francisco, Cal., succeeding F. E. Batturs, promoted.

W. M. Hogue has been appointed a traveling freight agent of the Chicago Great Western, with office at Des Moines, Iowa, succeeding John L. Sullivan, resigned to accept service with another company.

W. S. Dewey, traveling freight agent of the Chicago, Burlington & Quincy at Cleveland, Ohio, has been appointed traveling freight agent, with office at Boston, Mass., succeeding E. Copeland, promoted.

George D. Blair, Jr., has been appointed agent of the Union Line of the Pennsylvania Lines West of Pittsburgh, with office at South Bend, Ind., succeeding George E. Trenam, resigned to engage in other business.

J. J. Carroll, general baggage agent of the Chicago & Western Indiana at Chicago, having been appointed station master at the Dearborn station, succeeding T. W. Evans, deceased, Robert L. Parmelee has been appointed general baggage agent.

J. H. Davis, traveling freight and passenger agent of the Colorado Midland at Salt Lake City, Utah, has been appointed general agent, with office at Salt Lake City. F. N. Dowler has been appointed a general agent, with office at New York City.

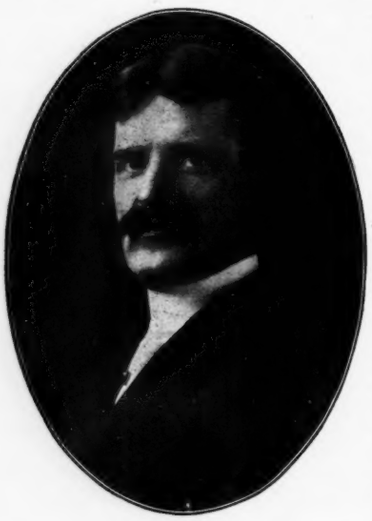
W. J. Keane, contracting agent of the Lackawanna Fast Freight Line at St. Louis, Mo., has been appointed commercial agent of the Rutland Michigan Central Line and southwestern agent of the Ontario Central Despatch, with office at St. Louis.

Robert B. Creagh, traveling passenger agent of the Southern Railway, at Selma, Ala., has been promoted to district passenger agent, with office at Birmingham, succeeding M. H. Bone, promoted. Emmet S. Sullivan, city passenger and ticket agent, at Selma, succeeds Mr. Creagh, and Grover C. Robson succeeds Mr. Sullivan. Willis H. Parnell, traveling passenger agent at Raleigh, N. C., has been transferred to Norfolk, Va., succeeding F. R. McMillin, promoted. J. O. Jones, city ticket agent at Raleigh, N. C., succeeds Mr. Parnell, and Marshall H. Schell succeeds Mr. Jones.

W. B. Bamford, general freight agent of the Canadian Pacific, at St. John, N. B., has been appointed division freight agent, Atlantic division, with office at St. John. H. E. MacDonnell, general freight agent, at Montreal, Que., has been appointed division freight agent, Eastern division, at Montreal, and M. H. Brown, general freight agent, at Toronto, Ont., has been appointed division freight agent, Ontario division, at Toronto. J. H. Griffin has been appointed district freight agent, Ontario division, at Toronto. W. J. Grant has been appointed district freight agent, at Hamilton, and L. Mulkern, has been appointed district freight agent, at London; W. S. Elliott, has been appointed division freight agent, Lake Superior division, at North Bay, and R. J. Hunt, has been appointed chief of tariff bureau, at Montreal, Que.

The freight traffic department of the Western Lines of the Canadian Pacific, of which W. B. Lanigan, assistant freight traffic manager at Winnipeg, Man., is in direct charge, has been reorganized into the Central Western, Kootenay and Boundary, and Pacific divisions as follows: R. E. Larmour, general freight agent at Winnipeg, has been appointed division freight agent of the Central division at Winnipeg; and reporting to him George H. Smith, assistant general freight agent at Winnipeg, has been appointed a district freight agent at Winnipeg, and R. W. Drew has been appointed a district freight agent, with office at Saskatoon, Sask. John Halstead, general freight agent at Calgary, Alta., has been appointed division freight agent of the Western division at Calgary. W. R. Haldane, general freight agent at Nelson, B. C., has been appointed division freight agent of the Kootenay and Boundary divisions, with office at Nelson. W. C. Bowles, general freight agent at Vancouver, B. C., has been appointed division freight agent of the Pacific division at Vancouver; and reporting to him F. H. Clendenning, assistant general freight agent at Vancouver, has been appointed a district freight agent at Vancouver, and W. H. Gardiner has been appointed a district freight agent, with office at Victoria, B. C. R. G. Holmes has been appointed chief of the tariff bureau, with office at Winnipeg, in charge of tariff publications and divisions on the Western Lines.

J. S. Hall, whose appointment as general passenger agent of the Lake Erie & Western, with office at Indianapolis, Ind., has been announced in these columns, began railway work 27 years ago as a ticket clerk with the Michigan Central at Detroit, Mich. He was later made agent at Battle Creek, Mich., and then Michigan passenger agent, first with office at Grand Rapids and then at Jackson. He was afterwards transferred to Detroit as Michigan passenger agent, and was then promoted consecutively to district passenger agent, general agent in the passenger department and assistant general passenger agent, resigning the last office on April 1, to become general passenger agent of the Lake Erie & Western, the Fort Wayne, Cincinnati & Louisville and the Northern Ohio, with office at Indianapolis, Ind.



J. S. Hall.

Engineering and Rolling Stock Officers.

Guy H. Watson has been appointed roadmaster and supervisor of bridges and buildings of the Montpelier & Wells River, with office at Montpelier, Vt., succeeding F. E. Dodge, deceased.

George E. Cessford has been appointed district master mechanic of the Chicago, Milwaukee & Puget Sound, with office at Miles City, Mon., succeeding A. V. Manchester, resigned.

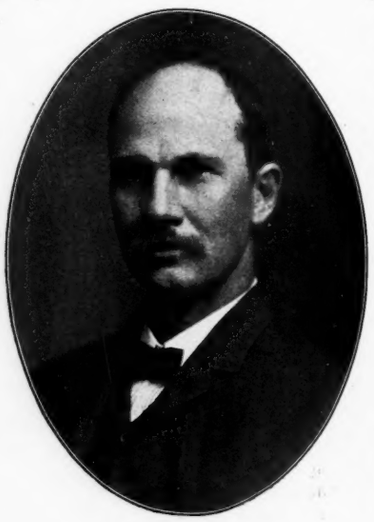
D. B. Bartholomew, assistant supervisor of signals of the Pennsylvania Railroad, at Camden, N. J., has been appointed assistant supervisor of signals of the New York division, with office at Jersey City, N. J.

W. H. V. Rosing has been appointed assistant to Vice-President Nixon of the St. Louis & San Francisco, in special charge of mechanical matters. (See an item under Executive, Financial & Legal.)

B. M. McDonald, division engineer of the Pennsylvania division of the New York Central & Hudson River, at Jersey Shore, Pa., has been appointed division engineer of the Western division, with office at Buffalo, N. Y., succeeding D. L. Sommerville, promoted. J. M. Fitzgerald, assistant signal engineer, at Albany, has been appointed engineer maintenance of signals, with office at Albany. J. Parker, signal supervisor, at Buffalo, has been appointed signal supervisor of the Western division, with office at Rochester, and J. W. Hackett, of the signal department at Albany, has been appointed signal supervisor of the Buffalo division, with office at Buffalo, succeeding Mr. Parker.

B. M. McDonald, who has been appointed division engineer of the Western division of the New York Central & Hudson River, with office at Buffalo, N. Y., was born January 17, 1872, at Springfield, Mass., and graduated from the high school of his native town in 1891, and in 1896, he graduated from the School of Civil Engineering at Lehigh University. In 1897 Mr. McDonald entered the service of the Pennsylvania Railroad in the maintenance of way department, and in May, 1899, he went to the New York Central & Hudson River, and since that time he has been in the service of that company, consecutively, as assistant supervisor of track on the Harlem division and the Mohawk division, then supervisor of track on the Western division; Rome, Watertown & Ogdensburg division, and Mohawk division. On July 1, 1905, he was appointed division engineer of the Pennsylvania division with office at Jersey Shore, Pa., which position he held at the time of his recent appointment as division engineer of the Western division.

Robert L. Doolittle, whose appointment as superintendent of motive power of the Atlanta, Birmingham & Atlantic, with office at Fitzgerald, Ga., has been announced in these columns, was born in April, 1867, at Waverly, Ala. He was educated in the common schools and began railway work in January, 1885, as a locomotive fireman on the Columbus & Western, now a part of the Central of Georgia, and the following year went to the East Tennessee, Virginia & Georgia, now a part of the Southern Railway, as a machinist's apprentice. In 1893 he was appointed general foreman of the steam lines of the Metropolitan Street Railway, at Atlanta, Ga., and two years later entered the service of the Atlanta Consolidated Street Railway. From 1897 until January, 1902, he was out of railway work, and was then appointed assistant master mechanic of the Central of Georgia, at Chattanooga, Tenn. He left this position in August, 1905, and again returned to railway work in July, 1907, as assistant master mechanic on the Central of Georgia, at Macon, Ga. In October, 1907, he went to the Atlanta, Birmingham & Atlantic as master mechanic, which position he held at the time of his recent appointment as superintendent of motive power.



R. L. Doolittle.

Special Officers.

F. E. Resler has been appointed agent of the land and industrial department of the Southern Railway and the Mobile & Ohio, with office at Columbus, Miss., a new agency.

OBITUARY.

W. S. Polhemus, until the latter part of 1909 joint division superintendent of the Texas & Pacific and the Missouri, Kansas & Texas at Fort Worth, Tex., died at Fort Worth on April 13, at the age of 73 years. Mr. Polhemus began railway work as a brakeman on the New York Central & Hudson River. He went to the Central of New Jersey as assistant superintendent, and was then division superintendent and later general superintendent. In 1888 he was appointed joint division superintendent of the T. & P. and the M., K. & T., at Forth, Worth, Texas.

Ford Woods, until January, 1911, assistant general freight agent of the Cleveland, Cincinnati, Chicago & St. Louis and the Cincinnati Northern, with office at Indianapolis, Ind., died in that city on April 14. Mr. Woods was born at Albion, Ill., in August, 1850, and began railway work in 1867 with the Illinois

Central. From that time until his retirement last January he was connected with the freight traffic department of different roads in Illinois, Indiana and Ohio. He became assistant general freight agent of the Big Four in 1890, and for a number of years from 1893 was general freight agent of the Peoria & Eastern division of that road.

Charles W. Goodyear, former president of the Buffalo & Susquehanna, the New Orleans Great Northern and the Buffalo, Attica & Arcade, died at Buffalo, N. Y., on April 17. Mr. Goodyear was born October 5, 1846, at Cortland, N. Y., and was educated at Cortland Academy. He was admitted to the bar in 1871, and practiced law until 1887, when he was elected vice-president of the Sinnemahoning Railroad, now a part of the Buffalo & Susquehanna. Mr. Goodyear was interested in the development of timber and coal lands, and his interest in railway construction began in connection with the development of his lumber interests. His brother, F. S. Goodyear, was associated with him in his Pennsylvania enterprises and also in the development of yellow pine timber lands in Mississippi and Louisiana. Mr. Goodyear was also interested in numerous industrial and banking institutions, and was a director in the General Railway Signal Company of Rochester.

Edward A. Moseley, secretary of the Interstate Commerce Commission, died at his home in Washington, April 18, after a long illness. He had been suffering from heart trouble since last summer, and this was complicated at the last with acute kidney disease. Mr. Moseley was born in Newburyport, Mass., in 1846. He first came into national prominence in 1887, having been appointed secretary of the Interstate Commerce Commission on the organization of that body in that year; but before this he had been a member of the legislature of Massachusetts, and was active in politics in that state. On going to Washington he at once took a hand in the efforts of the railway brotherhoods to secure such legislation as they wanted from Congress, and he has been prominent in everything of that kind that has been done at the capital during these 24 years. His energy and success in these lines made him very popular with all of the brotherhoods, and his office was filled with engrossed testimonials to his friendliness, and to the great value of his humanitarian labors. The legislature of Massachusetts adopted a joint resolution thanking him for what he had done. After the war in Cuba the administration of that country called upon Mr. Moseley, as secretary of the commission, to guide the new government in the establishment of freight tariffs and other traffic regulations; he went to Cuba, furnished what they wanted, and took no pay for his services. With similar unselfishness he espoused the cause of the labor unions in law suits to test the validity of the safety appliance laws, appearing in the supreme court as their attorney, without compensation. On the establishment of the Anthracite Coal Strike Commission in 1902, President Roosevelt appointed Mr. Moseley assistant recorder of that body. About a year ago the University of Notre Dame (Indiana) conferred upon him the degree of Doctor of Laws. Mr. Moseley is survived by a widow, a daughter, two brothers and a sister.

Secretary Moseley has been known to railway men mostly in his capacity of champion of the employees in the enactment and enforcement of the safety appliance laws. He was a man of independent means, and no one ever charged him with other than honest generosity in what he did for the trainmen; but, glorying in his Irish blood, he avowed that he loved a fight, and those railway officers who measured swords with him sometimes thought he carried this love too far. This was only one side of his character, however, for he was a most genial companion. He saw to it that the railways were vigorously prosecuted for violations of the coupler law and, on the other hand, resisted pressure put on him to try to enforce to the letter the unworkable air-brake law, as applied to long trains on steep grades.

Though neither a mechanical man nor a railway expert he has been entrusted by the commission with substantially the entire management of the safety appliance laws; and those Washington correspondents who say that he was the adviser of presidents and congressmen are not far from right, for these law-makers have uniformly made it their business to know the desires of the labor unions, and on this subject, in the railway field, no one could inform them more accurately than Mr. Moseley. And it must be said that in many cases he caused those desires to be more reasonable than they otherwise would have been.

Railway Construction.

New Incorporations, Surveys, Etc.

Baltimore & Ohio.—A contract has been given to H. S. Kerbaugh, Incorporated, Philadelphia, Pa., for piercing a tunnel at the summit of the Allegheny mountains in the vicinity of Sand Patch, Pa. The new tunnel will be of standard B. & O. design, with a bore of about 4,000 ft. and 30 ft. high, double-tracked throughout and lined with brick. Sand Patch is on the Connellsville division between Cumberland, Md., and Connellsville, Pa. The new tunnel is to cost about $1,250,000. It will greatly facilitate the operation of trains by providing three tracks on one of the busiest sections of the train line to Pittsburgh and Chicago. Work on the improvement will be started without delay.

Birmingham & Northwestern.—An officer writes that a contract has been given to J. W. Wright, Jr., Union Springs, Ala., to build from Jackson, Tenn., northwest to Dyersburg, 50 miles. The contract calls for the completion of the work within six months. Construction work is to be started at the Jackson end. The work calls for the handling of about 500,000 cu. yds. of earth work, clearing 100 acres of land, constructing 3,300 lin. ft. of trestles and building a 70-ft. steel span across Forked Deer river. The line will pass through Madison, Crockett and Dyer counties, via the towns of Whitestore, Humphries, Bells, Alamo, Crockett Mills, Friendship and Bessents, and traverses some of the best timber and farming lands in west Tennessee. Connection will be made with the Nashville, Chattanooga & St. Louis, the Illinois Central and the Mobile & Ohio at Jackson; the Louisville & Nashville at Bells, and with the Illinois Central and the Chicago, Memphis & Gulf at Dyersburg. R. M. Hall, president, Jackson; Mike Harvey, chief engineer, Dyersburg. (March 17, p. 525.)

Canada & Gulf Terminal.—An officer of this company, which operates a line from Ste. Flavie, Que., via Little Metis to Matane, 36 miles, is quoted as saying that plans are nearing completion to build an extension through the Gaspe peninsula to Gaspe basin, about 180 miles.

Canadian Northern.—This company is said to be asking for bids up to May 12 to build 163 miles of line as follows: Hope, B. C., to Boston Bar, 40 miles; Boston Bar to Lytton, 28 miles; Lytton to Ashcroft, 44 miles; Ashcroft to Kamloops, 51 miles. Some of the work will be heavy, and there will be a large amount of tunnels, including one of 2,400 ft. on the north side of Kamloops lake at Big Bluff. There will also be a 2,000-ft. tunnel through the mountain near Yale. Construction work along the Fraser river will cost $300,000 a mile. It is understood that it will cost $15,000,000 to build the 163 miles.

Chicago, Memphis & Gulf.—According to press reports, this company proposes to build an extension from Hickman, Ky., northeast through Fulton, Hickman, Carlisle, Ballard and McCracken counties to Paducah, about 50 miles.

El Paso & Southwestern.—An officer writes regarding the press reports that an extension is to be built to Tucson, Ariz., that the company is considering the construction of such a line, but has not yet definitely decided to carry out the work. (November 25, p. 1023.)

Erie Railroad.—An officer sends us particulars of second-track work on the Meadville and Cincinnati divisions, as follows: The entire Cincinnati division east of Marion, Ohio, will be double-tracked when the present improvements now under way and the improvements now authorized are completed, with the exception of one mile through the city of Akron. Second-track work has been completed on the Cincinnati division from Sherman to Sterling, 9.7 miles, and from Nankin to Ashland, 4.4 miles. Bids have just been received for second-track work from Tallmadge to Hills, 3.0 miles; West Salem to Polk; 5.4 miles, and from Barberton to Sherman, 2.7 miles, and bids are now being prepared for second-track work from Creston to West Salem, 9.2 miles, and Milton to Summit, Pa., 6.5 miles. On the Meadville division similar work has been completed from Braceville, Ohio, to Windham, 5.0 miles, and work is now under

way from Ravenna to a point five miles east, and from Brady lake to Kent, 1.6 miles.

Regarding the reports that the New Castle branch is to be double-tracked, an officer writes that the company has not made any definite plans at present to carry out this work.

Fairmont & Pittsburgh.—According to press reports, contracts will be let and work is to be started soon on the first section of this line from Blacksville, at the state line between Pennsylvania and West Virginia, north to Waynesburg, Pa., 13 miles. The company was organized to build from Fairmont, W. Va., north via Blacksville and Waynesburg, Pa., to Pittsburgh, about 75 miles, with a loop line from Fairmont, northwest. Right-of-way from Waynesburg has been secured to Bridgeville, in Allegheny county. W. M. Laws, Jersey City, N. J.; J. F. Beatty, Mannington, W. Va., and S. E. Miller, Fairmont, are said to be interested.

Fresno, Coalinga & Monterey.—This company will soon begin construction work on the Fresno-Coalinga division and later will build the Monterey-Hollister branch. Albert Albrecht is the promoter.

Gilmore & Pittsburgh.—According to press reports this company has given a contract for building an extension beyond Salmon City, Idaho. This includes the section down the river beyond Shoup, and near the mouth of Pine creek.

Great Northern.—An officer writes regarding the reports that work is to be started in June on the Midland of Manitoba, from Winnipeg, Man., south to the international boundary, also on terminals to be built at Winnipeg, that no instructions to commence this work have yet been given. (April 7, p. 877.)

Great Southern.—According to press reports, this company will start work within 60 days on an extension from Dufur, Ore., south to Juniper Flats, 40 miles. It is understood that it will cost $1,000,000 to build the line. Surveys have been made and bids are being asked for the work. The company now operates a 30-mile line from The Dalles to Dufur.

Hagerstown & Clearspring (Electric).—An officer writes that contracts are to be let after April 28 to build from Hagerstown, Md., west through Huyett and Wilsons to Clearspring, 12 miles. J. B. Ferguson, Hagerstown, may be addressed.

Hanford & Summit Lake (Electric).—According to press reports, this company will build an extension from Hardwick, Cal., to Jamison, 36 miles.

Illinois Central.—The improvement plans for this year include double tracking the lines from New Orleans, La., north to Ponchatoula, 48 miles, and rectifying grades between Macomb City and New Orleans, 105 miles, about $1,000,000 will be spent. With this double-track work completed, the Illinois Central will have a two-track line between Chicago and New Orleans.

Lake Superior Southern.—This company proposes to build from Huron bay, on the shore of Lake Superior, Mich., southerly through Baraga, Marquette and Iron counties, and eventually through Wisconsin to Madison, in all about 260 miles. The route is through the iron district of the upper peninsula and traverses a well timbered section. The offices of the company are at Madison.

Louisville & Nashville.—A contract has been given to Thrasher & Gunter, Knoxville, Tenn., for grading the yard on the Kentucky division about six miles south of Cincinnati, Ohio. The same contractors have had for some time a contract for enlarging the tunnel at Covington, Ky.

Minneapolis, St. Paul & Sault Ste. Marie.—An officer writes that contracts have been let to Foley, Welch & Stewart, St Paul, Minn., for work on the line from Frederick, Wis., north to Duluth, Minn. (March 24, p. 711.)

Mill Valley & Mt. Tamalpais (Electric.)—This company, which operates the Mount Tamalpais Railway, will extend that line, it is said, from Westpoint, Cal., to Willow Camp, seven miles. The offices of the company are at San Francisco.

Missouri, Arkansas & Gulf.—Incorporated in Missouri with $2,000,000 capital, and office at Rolla, Mo. The plans call for building from Rolla south to Bakersfield, 125 miles.

New Iberia & Northern.—This company is said to be making surveys for an extension north to Moreauville, La., about 30 miles. The company now operates a 48-mile line from Port Barre to New Iberia.

Oregon Short Line.—An officer writes that the company has made a survey for a line from Saline, Utah, on the Lucin cut-off, northwest to Burley, Idaho, but at the present time there is no prospect or intention of constructing such a line, as conditions do not warrant it. The company, however, expects to build this year that section of the line from Burley, southeast to Kelton Summit, about 60 miles. This line will traverse a section of Idaho that is rapidly being developed argriculturally. As yet no work has been started, but survey is being retraced and work will probably be started in the near future. (April 14, p. 926.)

Pacific Power & Light Co.—This company will build an electric line, it is said, from the mouth of the White Salmon river, Wash., to Trout lake, 30 miles. The offices of the company are at Portland, Ore.

Pennsylvania System.—The record of the mileage of the road on December 31, 1910, shows that the total length of main line on the lines east of Pittsburgh, Pa., and Erie, is 5,323 miles, with 1,858 miles of second-track; 548 miles of third-track; 475 miles of fourth-track, and 4,396 miles of company's sidings, a total of 12,600 miles. There was an increase of 19 miles of first-track; 32 miles of second-track; five miles of third-track; six miles of fourth-track, and 97 miles of company's sidings, a total increase of 159 miles. On the Pennsylvania Lines west of Pittsburgh and Erie, the mileage is 2,911 miles of first-track, 1,296 miles of second-track; 192 miles of third-track; 101 miles of fourth-track, and 2,408 miles of company's sidings, a total of 6,908 miles. During the year there was an increase of 103 miles of second-track, eight miles of third-track; 10 miles of fourth-track, and 69 miles of company's sidings, and a decree of 0.5 mile of first-track, making a total increase of 189.5 miles. The mileage of the Vandalia Railroad is: First-track, 923 miles; second-track, 106 miles; third-track, eight miles, and company's sidings, 679 miles, a total of 1,716 miles. During the year there was an increase of 22.12 miles of second-track and 35.24 miles of company's sidings, and a decrease of 0.62 miles of first-track, making a total increase of 56.74 miles. The grand total of all lines, including those operated by and associated in interest with the Pennsylvania Railroad, is 11,263 miles of first-track, 3,524 miles of second-track; 780 miles of third-track; 593 miles of fourth-track, and 8,457 miles of company's sidings, a total of 24,617 miles. Of this 6,324 miles of first-track is east, and 4,939 miles west of Pittsburgh and Erie.

Prairie Farm & Southwestern.—An officer writes that contracts are to be let soon for work on the line between Prairie Farm, Wis., and Emerald, 22 miles. George E. Scott, president, Prairie Farm. (November 18, p. 985.)

Southern Colonization.—An officer writes that this company will build from Whittier, Fla., south via Pine Island, Deeso, Halsey and St. George to Bassenger, 34.7 miles. The work calls for the handling of about 12,000 cu. yds. a mile. There will be 4,000 ft. of trestles, also station buildings and water tanks. The work will be carried out by day labor. F. B. Lynch, president, St. Paul, Minn., and C. H. Armstrong, chief engineer, Kissimmee, Fla., and Rochester, Minn.

Texas Roads.—The Gulf & Rio Grande Construction Company has been given a charter in Texas with $100,000 capital. The company proposes to build a railway through southwest Texas from a point on the gulf of Mexico, west to Eagle Pass, about 200 miles. The incorporators include: A. L. Lilliendahl, Saltillo, Mex.; L. Frisby, Beeville, Texas; R. P. Coon and A. Tolle, San Antonio, and R. K. Valentine, Brooklyn, N. Y.

United Railways.—This company has announced that it will open for traffic on April 16, the extension from North Plains, Ore., to Banks.

Vandalia Railroad.—See Pennsylvania System.

Wisconsin Northwestern.—An officer writes that this company expects to build about 10 miles of logging branches, and will carry out the work with its own men.

Railway Financial News.

Ann Arbor.—Farson, Son & Co. and J. S. Bache & Co., both of New York, have bought $600,000 two-year 5 per cent. notes of the Ann Arbor and are offering them at 99. The notes are secured by the deposit of $1,000,000 second mortgage bonds.

The Ann Arbor, according to a press dispatch from Toledo, has bought control of the Manistique & Lake Superior. Control of the Manistique & Lake Superior was held by H. B. Hollins and associates, who until recently were also in control of the Ann Arbor.

Atlantic, Waycross & Northern.—Stockholders have voted to authorize an issue of $4,800,000 bonds.

Baltimore & Ohio, Chicago Terminal.—The United States Circuit Court of Appeals has denied a petition of the minority common stockholders to intervene in the foreclosure proceedings brought against the predecessor company, the Chicago Terminal Transfer. The minority stockholders did not press their claims until after the Baltimore & Ohio, which bought in the property, had settled with the preferred stockholders and had refused to make any offer for the minority common stock. The court held that a resale would not benefit the common stockholders.

Canadian Northern.—Wm. A. Read & Co., New York, and the Dominion Securities Corporation, Toronto, Can., have bought $3,500,000 equipment mortgage 4½ per cent. bonds series A1, issued by the Imperial Rolling Stock Company, and guaranteed principal and interest by the Canadian Northern.

Chicago & Northwestern.—W. K. Vanderbilt, Jr., has been elected a director, succeeding Frank Work, deceased.

Chicago, Rock Island & Pacific.—Speyer & Co., New York, have bought $1,494,000 first and refunding mortgage 4 per cent. bonds, due 1934, issued to retire an equal amount of Choctaw collateral 4 per cent. bonds, series I, maturing May 1, 1911.

Cincinnati, New Orleans & Texas Pacific.—Potter, Choate & Prentice, New York, have bought $1,000,000 4½ per cent. ten year equipment trust certificates, series "C." The certificates were resold at a price understood to be such as to yield the investor 4.60 per cent.

Cleveland, Akron & Columbus.—See Pennsylvania Railroad.

Cleveland Short Line.—This company, whose capital stock is owned by the Lake Shore & Michigan Southern, has been granted permission to increase the outstanding stock from $3,750,000 to 7,375,000. A mortgage has been authorized to secure $20,000,000 bonds. It is understood that at least a part of these bonds will be issued in the near future.

Eagles Mere Railroad.—H. L. Greyelin has been appointed receiver of this narrow gage road which runs from Sonestown, Pa., to Eagles Mere Park, ten miles.

Hocking Valley.—The United States Supreme Court has denied a writ of mandamus directing the United States District Court to return to the state courts he case brough to restrain the officers of the Hocking Valley from merging this property with the Chesapeake & Ohio. The case therefore will be tried in Federal Court.

Illinois Central.—This company is to take over at foreclosure sale on May 5 the Indianapolis Southern. The main line of the Indianapolis Southern runs from Effingham, Ill., to Indianapolis, Ind., 177 miles.

International & Great Northern.—The receiver of this company and the Texas Railroad Commission have come to an agreement in regard to the valuation to be placed on the property for the purpose of issuing new securities after foreclosure sale and reorganization. The commission has agreed to an addition of $3,000,000 to the original $31,000,000 at which the property was valued. This makes the present valuation $34,000,000, the additional $3,000,000 being allowed for franchise value.

Maine Central.—This company has sold to F. E. Moseley & Co., New York, $1,500,000 one year 4 per cent. notes, dated April 1, 1911. The proceeds of the sale are to be used to pay a like amount of 5 per cent. four year notes maturing June 1.

Manistique & Lake Superior.—See Ann Arbor.

Manitoulin & North Shore.—This company has applied to the Canadian Parliament for permission to change its name to the Algoma Eastern. The company has made a mortgage to secure $3,000,000 5 per cent. first mortgage fifty year bonds, guaranteed principal and interest by the Lake Superior Corporation.

Manufacturers' Railway (St. Louis).—G. H. Walker has been elected a director, succeeding W. D. Orthwein, resigned.

Missouri Pacific.—After the retirement of Kuhn, Loeb & Co. from Missouri Pacific affairs, mentioned elsewhere in this issue it was announced that Speyer & Co., New York, will be substituted for Kuhn, Loeb & Co., as bankers, and all the other new interests on the board, including the Rockefellers, the Deutsche Bank and Blair & Co. are, according to present plans, to remain identified with the company as originally planned. James Speyer and Frank Vanderlip, it is understood, are to be elected directors, succeeding Paul M. Warburg and Cornelius Vanderbilt.

Northern Central.—See Pennsylvania Railroad.

Pennsylvania Railroad.—This company has bought, it is understood, nearly the entire minority stockholdings of the Cleveland, Akron & Columbus, heretofore held in Holland. The price paid is said to have been about 92. The Cleveland, Akron & Columbus runs from Hudson, Ohio, to Columbus, 144 miles.

William C. Bruce, counsel for the Public Service Commission of Maryland, has filed his opinion with the commission holding that the lease of the Northern Central to the Pennsylvania Railroad and the issue of additional stock is legal.

Seaboard Air Line.—Blair & Co., and Ladenburg, Thalmann & Co., both of New York, are offering $19,000,000 refunding mortgage 4 per cent. bonds of 1909-1959 at 83½. (January 20, p. 145.)

Southern Railway.—Kissel, Kinnicutt & Co., New York, have prepared an analysis of the present earnings and future earning possibilities of the Southern Railway. The circular containing this analysis contains a rather interesting chart showing the course of the net income, total charges, and surplus since 1896.

St. Louis & San Francisco.—This company has called for payment on August 1, 1911, $4,000,000 4½ per cent. notes, due February 1, 1912, but redeemable at par on 90 days' notice. The notes were secured by the deposit of the entire issue of $4,500,000 stock and $4,500,000 first mortgage bonds of the Arkansas Valley & Western. Cash for the redemption of these notes was provided through the recent sale of $7,000,000 general lien 15-20 year 5 per cent. bonds.

Tennessee & North Carolina.—A press despatch from Chattanooga, Tenn., says that the Champion Lumber Company, which has bought about 10,000 acres of timber land in North Carolina, near the Tennessee line, is to take over the control of the Tennessee & North Carolina.

Wabash-Pittsburgh Terminal.—The $433,771 receiver's certificates due April 11, 1911, have been extended for one year.

The Russian government has introduced a bill in the duma permitting railways to be built by private companies. It states that in Russia the railway mileage is only one-tenth that of America and one-fifth that of Western Europe. The supporters of the proposition claim that the increase of the Russian network of railways is necessary for the further development of the productive forces of the country. The government on its own account cannot, it is stated, increase its railway building program, owing to a large number of unavoidable expenditures, hence it finds it necessary to grant concessions for private railway construction. These private railway companies will receive remuneration for the outlays made on preliminary railway surveys and determination of directions and locations from the capital stock. The time limit for the purchase of a private line by the imperial government is 25 years.

Supply Trade Section.

Jenkins Bros., New York, have moved their general offices from 71 John street, to 80 White street.

Alexander Crawford has been made purchasing agent for the Hyatt Roller Bearing Company, Newark, N. J.

The Chicago Pneumatic Tool Company, Chicago, has enlarged its quarters in the Fisher building, by taking nearly the whole 10th floor.

Rodman Gilder, secretary of the Crocker-Wheeler Company, Ampere, N. J., has resigned to go to Dick Bros. & Co., New York, brokers.

The Kennicott Company, Chicago, has moved its sales offices from the sixth to the fourth floor of the Corn Exchange Bank building. It will have about half the entire floor.

Gardiner M. Lane, of Lee, Higginson & Co., New York, brokers, was elected to the board of directors of the United States Steel Corporation on April 17, succeeding the late Nathaniel Thayer.

Frank B. Hart, formerly sales manager of the Ohio Steel & Foundry Company, Lima, Ohio, has resigned and organized the firm of Hart, Doane & Hart, Rector building, Chicago, dealers in railway and industrial supplies.

The United States Cast Iron Pipe & Foundry Company, New York, has moved its Chicago office from the Rookery to the Peoples Gas building, where it will have about double the space afforded in its present quarters. The company has been in its present offices for the past 12 years.

The United States Electric Company, New York, has received orders from the Canadian Pacific for 255 Gill selectors. The Canadian Pacific makes extensive use of the telephone in train despatching. Gill selectors have also been ordered lately by the Seaboard Air Line for 74 telephone stations and by the Atlantic Coast Line for 88 stations. The Seaboard Air Line has used 52 Gill selectors for about a year; all of them on one line.

The Power Specialty Company, New York, has received orders from the following companies, among others for Foster superheaters: Cleveland, Cincinnati, Chicago & St. Louis; Milwaukee Electric Railway Company; Winnipeg Electric Company; New York, New Haven & Hartford; El Paso Electric Railway Company. With one exception these contracts are all from previous users of Foster superheaters, and in many cases the contracts represent from the fifth to the fifteenth repeat order.

The government of a Latin-American country has under consideration the construction of roundhouses and railway repair shops at a cost of $60,000 or $70,000. The plans have been prepared, and it is expected that construction will be begun before the end of the year. It is proposed to put in up-to-date machinery suitable to rebuild an engine or thoroughly overhaul a coach. The address of the official in charge may be had by applying to the Bureau of Manufactures, Washington, D. C. File No. 6,541.

The Boss Nut Company, Chicago, announces that arrangements have been made for the United States Steel Corporation to make the Boss nuts at the Joliet, Ill., plant. Special machinery is being installed for that purpose. J. A. McLean, formerly with the American Arch Company, New York, joined the sales department of the Boss Nut Company, April 1, with headquarters in Chicago. The Adreon Manufacturing Company, St. Louis, Mo., has been appointed southwestern representative of this company, and a branch office has been opened in the Candler building, Atlanta, Ga.

TRADE PUBLICATIONS.

Melting Furnaces.—The Rockwell Furnace Company, New York, in bulletin 28 illustrates and discusses its Simplex melting furnace for melting aluminum, brass, bronze, etc.

Electric Fans.—The General Electric Company, Schenectady, N. Y., has devoted bulletin No. 4806 to its ceiling, column and desk fans. Illustrations, price lists and dimension tables are included.

Generating Sets.—The Crocker Wheeler Company, Ampere, N. J., has published in bulletin No. 130 a description of its small direct current generating sets, consisting of Crocker Wheeler generators, 1.75 to 21 k. w., driven by Giles type E engines. This bulletin supersedes bulletin No. 109.

Signal Relays.—The Hall Signal Company, New York, has published a small illustrated booklet describing its new signal relays. It claims that this is a line of relays in which the resistance of the contact does not increase with use, and in which every known precaution has been taken for the prevention of signal failures.

RAILWAY STRUCTURES.

ARMOURDALE, KAS.—See Kansas City, Mo.

BALTIMORE, MD.—The Western Maryland has bought the block adjoining its main terminal, and it is announced will build a passenger and freight depot on the site.

BOYLES, ALA.—The new shops of the Louisville & Nashville will probably be completed within the next 60 or 90 days, the total cost being approximately $700,000.

CHICKASHA, OKLA.—The Chicago, Rock Island & Pacific has let the contract to A. W. Lane, Chicago, for the building of a one- and two-story, 32 ft. x 200 ft., brick and plaster, $35,000 passenger station.

GLENWOOD, N. Y.—The New York Public Service Commission, Second district, has authorized the New York Central & Hudson River to discontinue its present Glenwood station at the foot of Point street in the city of Yonkers, on the condition that a new station with ample accommodations, including elevators and other facilities for the handling of baggage be provided at the foot of Glenwood avenue.

GREENVILLE, S. C.—According to press reports, plans are being made by the Piedmont & Northern (Electric) to build shops in Greenville.

KANSAS CITY, MO.—The Chicago, Rock Island & Pacific has built a new freight house and team tracks in Kansas City, and will improve its yard at Armourdale during the coming season. Other work on the second division includes a large amount of bank widening, the building of three eating houses and two coal chutes.

MIDDLETOWN, N. Y.—An officer of the New York, Ontario & Western writes that the company is putting up an erecting shop 65 ft. x 360 ft., two stories high, and a storehouse 33 ft. x 218 ft., one-half of which is to be two stories high; also an addition to the power house, 45 ft. x 110 ft. This work is under contract with Westinghouse, Church, Kerr & Co., and will probably be finished in July. The estimated cost of improvements is $250,000.

OPELIKA, ALA.—An officer of the Central of Georgia writes that the company is considering the question of remodeling the present station at Opelika, the work is to be carried out by the company's men.

SAN FRANCISCO, CAL.—The Southern Pacific has plans made, it is said, for building an addition to the hospital at San Francisco, for which bids are not being asked. It is understood that the improvements will cost $35,000.

SPOKANE, WASH.—The Oregon-Washington Railroad & Navigation Company has given contracts at $900,000 for steel for two bridges on the North Coast division. One of the bridges will be the largest in the northwest, crossing the Snake river at an elevation of 275 ft., near the mouth of the Palouse river. It will be 4,070 ft. long, and besides crossing the river also will cross the old O. R. & N. and Northern Pacific tracks. Due to its height false work is out of the question, and a huge traveler will be erected to put the steel in place. The second bridge will be built over the Spokane river at the mouth of Hangman creek, it will cross both streams. It will be 165 ft. high and 3,400 ft. long. Both bridges are to be completed within 15 months and work will be commenced at once.

TOLEDO, OHIO.—The Pennsylvania recently bought the property of the old Toledo rolling mill of the Republic Iron and Steel Company, and, it is said, will convert the building into repair and car shops.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Cuban is making inquiries on 10 locomotives.

The Chicago & North Western has ordered 30 locomotives from the American Locomotive Company.

The Marshall & East Texas is said to have bought two 75-ton locomotives from the Kilby Locomotive & Machine Company. This item is not confirmed.

The Fort Dodge, Des Moines & Southern has ordered one 404-E-80 electric locomotive. The American Locomotive Company will furnish the mechanical equipment and the General Electric Company the electrical equipment.

The Bingham & Garfield, mentioned in the *Railway Age Gazette* of March 17 as having ordered 1 Mallet locomotive from the American Locomotive Company, placed an order for 2 Mallet locomotives at that time with the American Locomotive Company.

The Missouri, Oklahoma & Gulf has ordered 4 consolidation locomotives from the Baldwin Locomotive Works. The dimensions of the cylinders will be 20 in. x 26 in., the diameter of the driving wheels will be 46 in., and the total weight in working order will be 165,000 lbs.

The New York, Ontario & Western has ordered 2 six-wheel switching locomotives from the American Locomotive Company. The dimensions of the cylinders will be 20½ in. x 26 in., the diameter of the driving wheels will be 51 in., and the total weight in working order will be 150,000 lbs.

The San Antonio & Aransas Pass, mentioned in the *Railway Age Gazette* of March 10 as being in the market for 4 mogul locomotives, has ordered this equipment. The Baldwin Locomotive Works will build 3 of these locomotives, and the Lima Locomotive & Machine Company will build 1. The cylinders will be 19 in. x 26 in., and the total weight in working order will be 150,000 lbs.

CAR BUILDING.

The Midland Valley is in the market for coaches and combination cars.

The Erie has ordered 10 all steel frame box cars and 4 steel underframes for passenger cars from the Kennicott Company.

J. G. White & Co., New York, is in the market for 50 twenty-ton steel underframe box cars. These cars are for use in Cuba, and will have a gage of 1 meter.

The Seaboard Air Line is in the market for 30 caboose cars in addition to the 1,000 box and 200 phosphate cars mentioned in the *Railway Age Gazette* of April 7.

The New York Central Lines are building 1,000 refrigerator cars at their shops at East Rochester, N. Y., for the Merchants' Despatch Transportation, New York.

The Pittsburg & Lake Erie has ordered 1,000 fifty-ton gondola cars from the Pressed Steel Car Company, and 1,000 forty-ton coke cars from the American Car & Foundry Company.

IRON AND STEEL.

The Baltimore & Ohio is in the market for 7,500 tons of rails.

The New Orleans Railway & Light Company has ordered 500 tons of rails from the Carnegie Steel Company.

The Richmond, Fredericksburg & Potomac has ordered 100 tons of rails from the Maryland Steel Company.

The Galveston, Houston & Henderson has ordered 735 tons of rails from the Tennessee Coal, Iron & Railroad Company.

The Pennsylvania is reported to have ordered 6,000 tons of plates and shapes from the Cambria Steel Company, for use in the shops at Altoona, and 500 tons of fabricated steel for its new freight sheds at Harrisburg, Pa., from the Pennsylvania Steel Company.

The Isthmian Canal Commission is asking bids until May 10 on rails, frogs, switches, switch stands, tie plates, angle bars, track bolts and spikes, etc. Circular No. 628.

The Boston Elevated has ordered 600 tons of Bessemer rails from the Pennsylvania Steel Company, and 1,200 tons of open hearth rails from the Bethlehem Steel Company.

The Missouri, Kansas & Texas, mentioned in the *Railway Age Gazette* of March 31 as being in the market for 14,000 tons of rails, has ordered 8,000 tons from the Pennsylvania Steel Company, and 6,000 tons from the Steel Corporation.

General Conditions in Steel.—Buying in the steel industry continues to be very light, but prices hold firm. The Steel Corporation is operating at about 73 per cent. of its capacity. A decrease both in orders and unfilled tonnage is expected for the month of April, but inquiries are large, so a marked improvement is looked for next month.

SIGNALING.

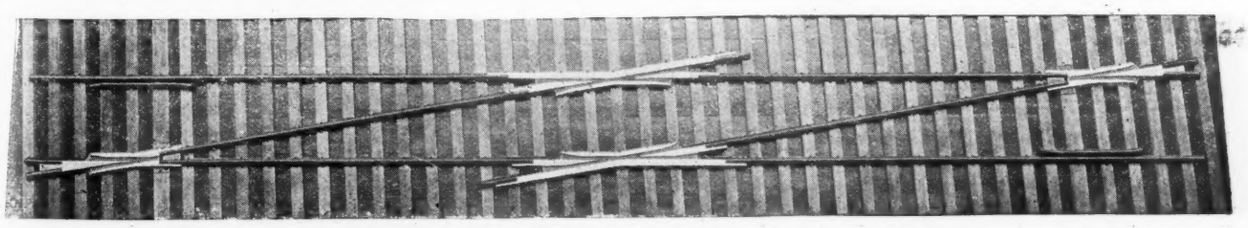
The Kansas City Terminal will soon displace the old 36-lever hydro-pneumatic interlocking machine at the west end of the Union station with an electro-pneumatic machine of 59 levers. The signals will be made dwarfs in almost all cases. The old switch movements will be retained. Electric detector locking will be used.

Manganese Frog Crossings.

The accompanying illustration shows a model of the R-N-R single and double manganese frog crossings made by the Indianapolis Switch & Frog Company, Springfield, Ohio. The model is a convenient means of exhibiting these frogs; it has already been used at the Coliseum exhibit during the engineering convention in Chicago last month.

The frog is cast in one piece, thus eliminating the 10 pairs of splices used on the built-up frog. The connecting rails are joined directly to the frogs proper by manganese easers, giving good solid connections. There are no parts of these frogs which, when they are to be renewed, require the removal of the frog itself. In other words, when the crossings are put down they need not be disturbed during the life of the manganese.

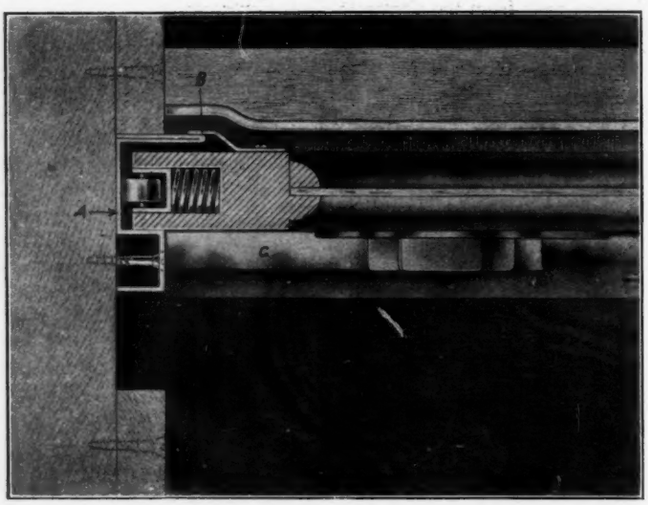
This frog should maintain a maximum width of tread at all connections beyond the points of intersection, eliminating point and joint pounding so as to make the frog nearly as smooth riding as the rail itself. The single end R-N-R frogs are now in use on nearly 50 of the large railways.



R-N-R Single and Double Manganese Frog Crossings.

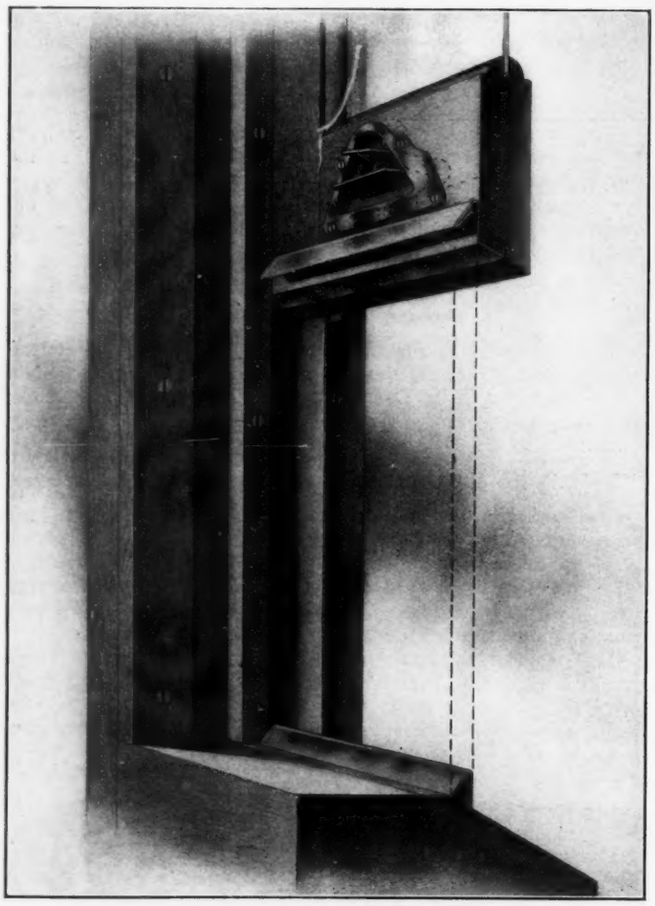
Metal Weather Strip for Coach Window Sash.

The ordinary coach window sash is held in place by wooden stops and an effort is made to keep out dust and rain by weather strips applied on the outside, but the pressure of the wind will



Horizontal Section of Acme Window Sash.

sometimes force the sash inward away from the weather strip, making an opening for dust and rain to enter. The Acme Supply Company, Chicago, has designed metal stops and weather strips which tend to overcome this objection. A partial horizontal



Acme Window Sash Showing V-Shaped Metal Strips.

section through the sash shows the metallic stop at A, the vertical weather strip at B and the horizontal strips on the sill at C. In the other illustration the V-shaped horizontal strips are shown in section. The one on the sash wedges tightly on the fixed one on the sill, and the weight of sash tends to keep the joint tight as the sash does not rest on the wooden sill as is usually the case.

Any irregularity in the fit of the wood portion of the sash, due to shrinkage or warping, causes leakage in the usual construction, but in these windows the spring of the V-shaped metal strips overcomes this difficulty and with excessive wind pressure from the outside the joints become tighter. The same is true of the vertical metal strip B; the wind pressure on the outside is constantly tending to keep this joint tight. The metallic stop A is slotted diagonally, so that when the catch is in, the weight of the sash tends to make it bear hard against the inner surface, which also has the effect of making a tight joint. Tests of the stops and metal weather strips have been made with compressed air and with water under pressure from a hose and no leakage was observed.

Insulation for Steel Passenger and Refrigerator Cars.

After considerable experience with various kinds of insulating materials for steel passenger and refrigerator cars, Resisto Insulation, manufactured by the General Railway Supply Company, Chicago, has been found to be very satisfactory. It is a non-conductor of heat and is non-absorbent, thus giving protection against varying temperatures, fire and water, which makes it desirable for car insulation. The felt and its protective coatings are flexible and may be made to conform to any curved surface of large or small radius without injury to its fibers. It is also very light as compared with other insulating materials.

Resisto Insulation Applied to Steel Passenger Car.

Numerous tests conducted by railways, car builders and private laboratories have demonstrated that Resisto Insulation is especially efficient as an insulating material for all-steel passenger cars, and reports of the methods and results of these tests will be furnished on application. Resisto Insulation is made in single and double thicknesses of ¼ in. and ½ in. respectively, the former being recommended for use in connection with metallic steel sheathing and the latter where steel plates only are used. Steel plate construction makes a solid conducting surface and necessarily requires a larger amount of insulation. The single thickness is sufficient when metallic (steel) sheathing is used, because its air cells or chambers ½ in. deep provide an air insulation which in itself is a good protection against heat and cold. Sample pieces of Resisto Insulation will be furnished for inspection and test purposes upon request.

The Anglo-German syndicate, which recently received a concession for the construction of a railway from Puerto Pinas to the interior of Darien, has requested the government's permission to extend the railway to Panama City by way of Chepo, the latter place being situated in the narrowest part of the isthmus. If permission is granted for this extension, which is considered likely, the new road will open up for colonization extremely rich virgin lands.